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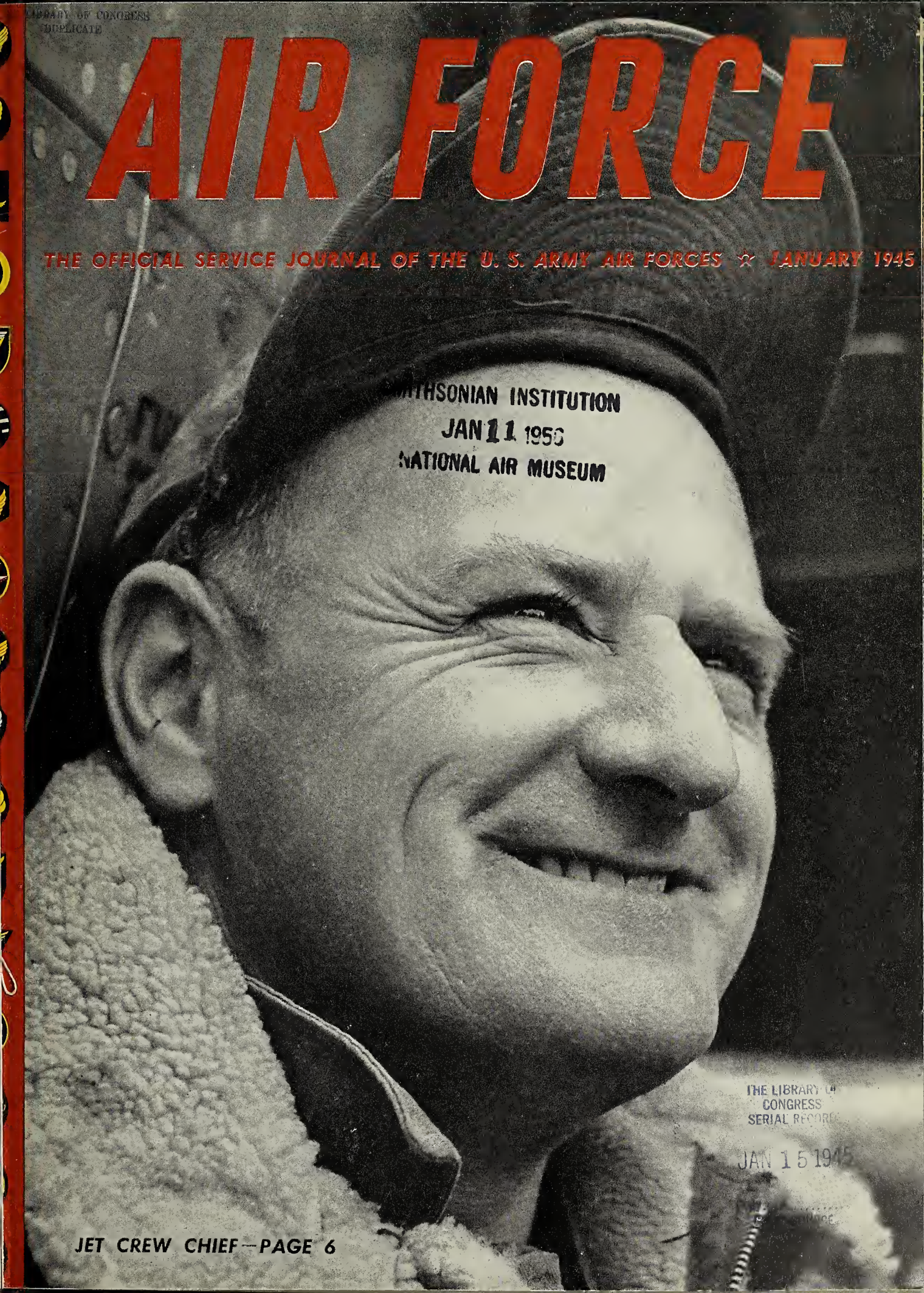
THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES ☆ JANUARY 1945



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JET CREW CHIEF—PAGE 6

H. H. ARNOLD, GENERAL OF THE ARMY

The AAF received its fifth star on December 15, 1944, when the Commanding General was promoted to the newly authorized military rank of "General of the Army." For details, see Page 22.

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Rendezvous

Personal Attraction

Dear Editor:

Your encouraging note to write and comment on the new cover is appreciated. The new cover has a personal attraction—especially to sweethearts and wives of AAF men overseas. That insignia that stands for your man is the attraction.

In fact, when letters get slowed up from India, I go to the library and read the current AIR FORCE or re-read back copies. It helps immensely to understand what kind of a place our boys are in. The pictures and well-written articles are connecting links between Johnny and me although actually there are 1,800 miles between us now.

Keep Writing the Magazine and Keep 'em Flying.

Miss Marté Hargrove, Oberlin, Ohio.

Mashed Potato Sandwich

Dear Editor:

On behalf of myself, and hundreds of other liaison pilots, both in the U. S. and overseas, I wish to thank AIR FORCE for the splendid article in the October issue, entitled "Little Planes with a Big Punch."

I'm getting very tired of explaining about the "L" in my wings! Liaison pilots have long been the "stepchildren" of the Army Air Forces pilots. We are the only enlisted pilots left in the Army. (But I don't want to start on that — I hear enough as it is!) That article certainly illustrated the usefulness of liaison squadrons in the Air Force and was greatly appreciated by all "L" pilots.

I wanted to write and thank you, but as you can see I'm about as sharp as a mashed potato sandwich when it comes to composition and literary style, but you get the idea.

I cannot think of a single thing to criticize AIR FORCE magazine about, except that it is not big enough and does not come out often enough.

Thanks again.

S/Sgt. Robert C. Crampton,
Lafayette Army Air Field, La.

Humdrummery?

Dear Editor:

In reading AIR FORCE, issue of November 1944, I ran across the story of "The Man with the Private Breeze." It is an interesting little story but I can't see why you would print such humdrummery. So a staff sergeant got his wind up and blew a spam sandwich and a magazine around. There is nothing remarkable in this.

There was a fellow in basic training at Atlantic City, Pvt. John Henry Murphy, Jr. He was an ordinary robust EM. But he had one outstanding characteristic. He lost his head. In the mornings he would be running around the corridors of the Ritz-Carlton Hotel looking for it. Sometimes it would be in the PX, sometimes in the Merry Go Round Bar. Once it was in the CO's wastebasket. After a while we got used to it and whoever found it would

Vol. 28 No. 1 January 1945

AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

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How Sharp are YOU?

A Photo test of Your Observational Accuracy

Here's a challenge to your ability to "see what you look at!" Study this photograph for 60 seconds; time yourself! Then turn to page 29 and see how many questions you can answer about it. Score 10 for each correct answer. 100 is perfect. Out of 25 AAF officers and enlisted men tested, the high score was 100, the low was 40. The average was 70.

HOW SHARP ARE YOU? Turn to page 29

Rendezvous

(Continued from Page 1)

leave it on his bed. After a few weeks nobody took any notice of him. He became just another guy. Somebody told me later that he was made a drill master after he completed his basic training.

And there was a mess sergeant at Greensboro, N. C., Grover F. X. Marastoi. He always wore a steel helmet with the chin strap laced tightly under his chin. His outstanding characteristic was that he blew his top when anything went wrong. In civilian life he had an attic full of tops. They cost fifteen dollars each and were made by the American Top Co. of New Jersey. When he was drafted he found that he could no longer afford to buy new tops and, since his reserve supply was used up at the reception center, he had to switch to the steel helmet method. He was like a weathervane when I worked for him. When the helmet began to strain upward all the KPs scurried for shelter.

T/Sgt. Allard of Greensboro is hardly worth mentioning. He was a PT instructor. Every day at 1500 he ran us into the ground. On windy days he would yell his lungs out. They were a fine pair but a little the worse from wear from rolling in the dust.

A permanent party technical sergeant at Scott Field, Ill., whom I will not name, ran for all he was worth every morning. Exactly at noon two new, shiny pennies would drop from the heavens into his outstretched hand. Every five days he would buy a beer at the PX.

The latest unconventional character I have met is 2d Lt. Charles Ullritch. I was eating a box of ice cream in the fine PX here at Yuma Army Air Field when the ice cream suddenly melted and all the clothing on the right side of my body began to smolder. The girl behind the counter began to turn brown, her eyebrows singed off, her hair burst into flame. I noticed that the floor was charring around a second lieutenant who had just entered.

"Who is he?" I asked a nearby mechanic, moving a little farther away as the heat grew. "That's Lieutenant Ullritch. He's a hot pilot," the mech replied.

Roger, dodger, wilco, Philco and out.

Cpl. William W. Ryan, Yuma, Ariz.

Goggles

Dear Editor:

I notice that your little man in "Shooting the Breeze" is not wearing the new

B-8 goggle. I mention this with the thought that you may want to issue one to your little man.

Polaroid Corporation, Cambridge, Mass.

He has one but he keeps it in his pocket. —Ed.

Subscriptions to AIR FORCE

Dear Editor:

. . . Would like to know if it is possible to get a personal copy of AIR FORCE, either through subscription or otherwise.

Lt. W. L. Davis, Tracy, Calif.

Dear Editor:

. . . I am interested in receiving your monthly magazine AIR FORCE as I have a son in service with the 8th Air Force and would like to know if civilians are eligible to subscribe, also if there are any back numbers available.

W. S. Burgan, Hoisington, Kansas.

Dear Editor:

I have recently been discharged (Honorable Discharge) because of physical disability from the Air Corps and, being very much interested in your publication AIR FORCE, I should like to continue receiving it. Please advise me as to how I can obtain a copy monthly.

James E. Byrne, Jr., Ponchatoula, La.

Dear Editor:

Can you please tell me how to get a subscription to your AIR FORCE magazine? If there is any charge, please start my subscription. I will forward the money.

Pvt. Marvin J. Allard, Fort Sill, Okla.

Dear Editor:

. . . It is a most interesting publication, and we read each issue from cover to cover. Naturally, with a pilot son, we are terribly eager to read everything we can about airmen and the machines they fly and the things they do, or shouldn't do.

Will you be good enough to let us know whether or not we can subscribe to AIR FORCE. The above address will reach me.

Mrs. P. T. Bodge, Boston, Mass.

Readers Davis, Burgan, Byrne, Allard and Bodge and all others interested, whether military or civilian, may obtain their own personal copies of AIR FORCE *by ordering them direct from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. The rate for single copies is 20c. The annual subscription rate (12 monthly issues) is $2.00. These rates apply to individuals with APO or Fleet Post Office addresses as well as those within the continental limits of the United States. All remittances should be made payable to the Superintendent of Documents. Postage stamps are not acceptable. No copies will be mailed until remittances are made. Copies prior to the December 1944 issue are not available for purchase. This availability of personal copies does not in any way affect the regular bulk distribution of* AIR FORCE, *without charge, to AAF units throughout the world.*—Ed.

(Continued on Page 30)

In This Issue

The face on our cover this month may not have launched 1,000 ships, as the one belonging to Helen of Troy is alleged to have done, but it has seen plenty of aireraft take-off. It belongs to S/Sgt. Earl Kohler, jet crew chief at Wright Field. As indicated in the jet maintenance article on Page 6, Sgt. Kohler has had 26 months' service. Before being assigned to jet planes he worked on foreign aireraft, some of them German, that were brought to Dayton for experimental purposes. For 15 years before the war he tinkered with automobiles in a garage in Jeffersonville, N. Y. It's his guess that in the next war—if there is one—all fighter planes will be jet propelled.

If, when you've finished the article "Prepare to Bail Out" on Page 39, you feel inclined to growl to yourself "What does that writin' fella sittin' behind a desk know about it anyway?", be informed that Major Davis made a couple of jumps before he set about writing the article. He says he "kind of enjoyed" the experience but "turned bright green" while waiting for the signal to bail out.

Taking a last look at the Contents Page for this issue, we see that our geographical coverage is pretty extensive. The following areas get feature treatment in this order: Japan, New Guinea, France, England, Holland, Italy, Germany, China, Alaska, Australia, and, of course, the USA. At least 13 of our air forces are active over these territories. Covering them all is getting to be a man-sized job.

S/Sgt. Mark Murphy, whose report from the German front you will find on Page 16, writes us a rather sour estimate of man's best friend, the jeep. He says, and we quote: "The jeep is a nice, picturesque little vehicle, but it is cold, bumpy, has iron seats, and it keeps tearing your clothes. I haven't a whole pair of pants to my name." Evidently Mark is still brooding, too, on the mission he flew in a night fighter where they ended up by pranging the Black Widow on their own fog-bound runway. "Incidentally," he says, "my postwar plans for my son Timothy include his not having to fly in airplanes and his not being shot at by anybody."

One of our other correspondents, Maj. Herb Johansen, is happier about a mission he inadvertently flew when leaving the Philippines, where he reported our Leyte landings. He says, "When I got down to Tacloban strip, I noticed them loading 500-pound bombs into a B-25, and was told it was the one I was going in. I climbed aboard and we took off with P-38 escort.

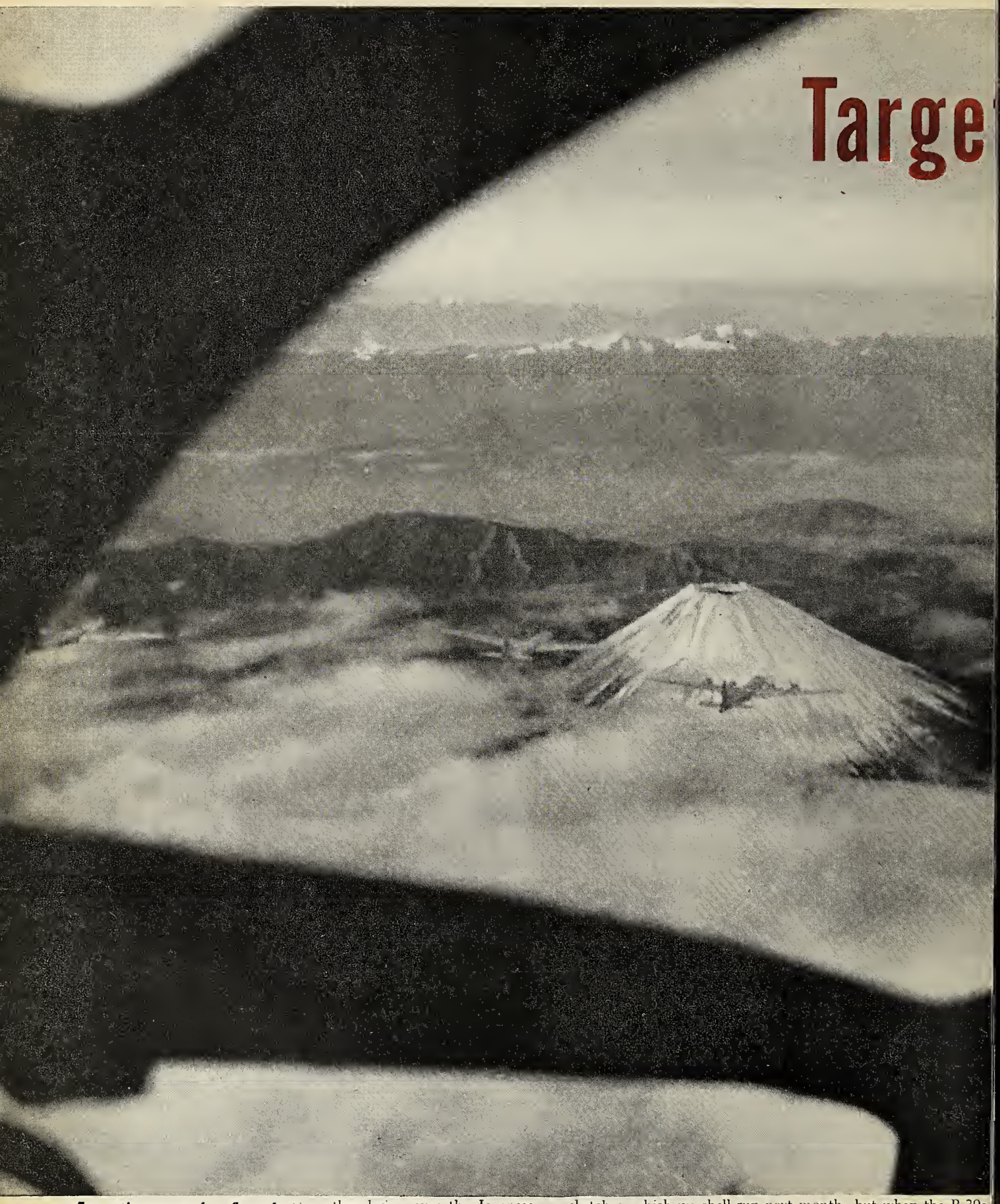
"To my amazement, we took a little diversionary flight over Ormoc Bay, on the west coast of Leyte, and dropped our bombs on shipping in the harbor. Think we got a Jap transport! Our pilot was so happy that for the last half-hour before getting to Morotai he flew about four inches above the water, and in between engaged in violent evasive action."

Lt. Col. John D. Landers, whose first taste of air combat is related on Page 63, is a big Texan who has been fighting the aggressor nations for three years. Last report we had on him, he had downed 14 enemy aircraft ranging from Focke-Wulfs to Zeros. He holds the Silver Star and cluster, DFC and cluster, Air Medal and four clusters, Purple Heart, and Unit Citation with one cluster. Most flyers remember their first fight with startling clarity, and if any others wish to send in a 600-word account of their initial fracas we'll be glad to consider it for publication.

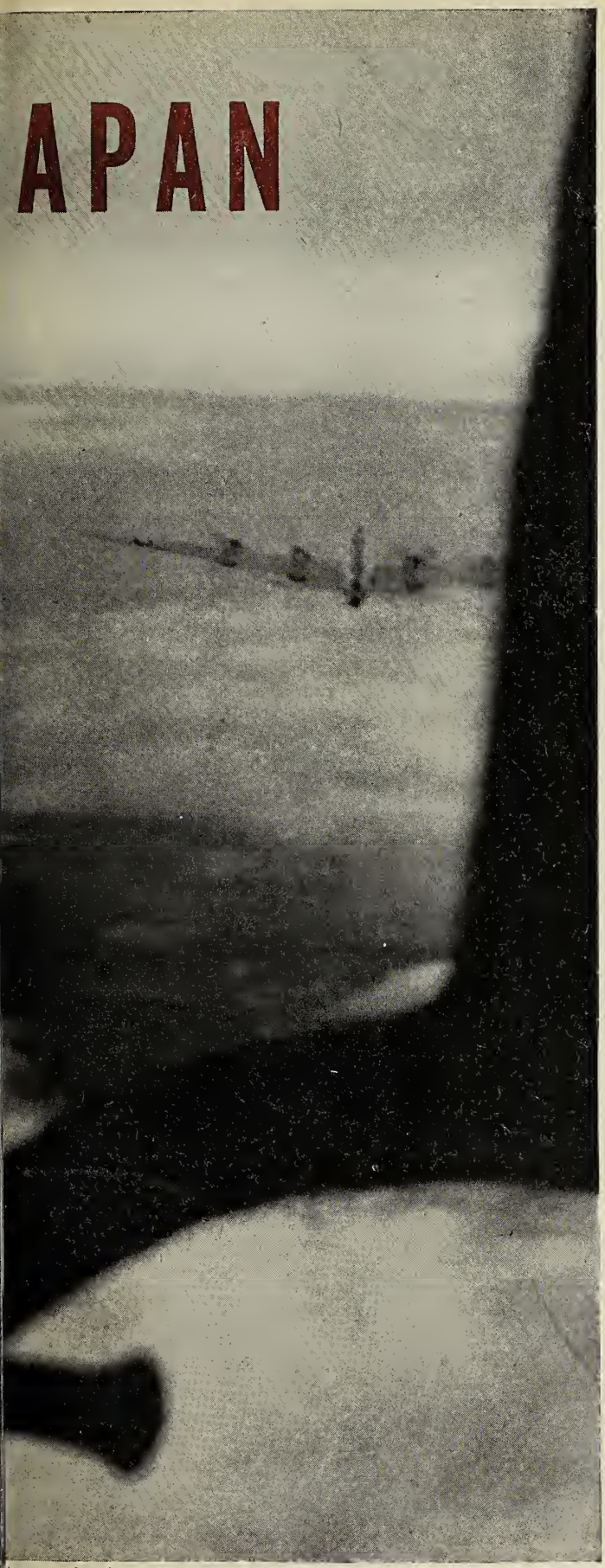
Capt. Manford Susman, our missionary among the cannibals of New Guinea (see "Into Hidden Valley," Page 9), is shown below with some of the native police who accompanied the expedition. Manford didn't say so, but we wish to record that Eunice Airstrip which the expedition constructed is named after his wife. ☆

Captain Susman, typewriter, Australian Native police, and glider on Eunice Airstrip.

Targe



From the nose of a Superfortress thundering over the Japanese mainland in the first Tokyo raid, Capt. Raymond Creekmore took this photograph of Mt. Fuji, almost three years to the day after Pearl Harbor. Captain Creekmore went on the raid to make a series of sketches, which we shall run next month, but when the B-29s within camera-lens range of Fuji, Captain Creekmore switched ing pencil for his Speed Graphic which he set at F. 11 and, us yellow filter, snapped this photo at 1/200 on Super XX Kodak



is was the first attack on Tokyo since the historic visit of General olittle's B-25s in April, 1942. Bombs were released at 12:12 over the shashima plant of the Nakajima Aircraft Co., primary target. Flak s light, fighter opposition sporadic. Two Superfortresses failed to return.

AIR FORCE Staff Artist Captain Raymond Creekmore goes on the first Tokyo raid with the B-29s and snaps a great war picture. Here are his notes on the mission

Sweating it out before take-off was a little tough because there was so much we didn't know. Photo recon had spotted hundreds of Jap fighters packed into the fields near Tokyo and enemy radio broadcasts kept telling us what terrific flak to expect. Also we knew we were going on the longest over-water bombing mission ever carried out and this made us very solicitous of the health of our navigators.

And then, with shocking suddenness, we were doing it. We were over an island off the Japanese coast and light, ineffective flak burst under us.

A few seconds later our pilot sang out, "On the ball, gunners!" and we saw a plane at our altitude approaching head-on at great speed. But it turned out to be another B-29 which we guessed had lost its formation. It banked sharply and joined us.

Our pressurization equipment was working, but we all wore winter flying equipment and flak suits; every man had his oxygen mask hanging from the side of his helmet in case flak should puncture the cabin.

Almost as soon as we could see the coast, Mount Fuji was visible. Then into the bomb run, with Tokyo spread out below us and the bombardier spotting all check points —visibility marred only by some small ground clouds. We were the last of the B-29 force and the Jap had our range, but the flak—while patterned around us in considerable volume—didn't seem to be hitting anybody. Then someone yelled "There are the fighters!" and the intercom was full of gunners talk: "I can't get 'em, Basel. You take 'em." "Watch that baby coming in at two o'clock, low!"

Two Japs made a frontal attack but then grew cagey, half-rolled, and broke off below us. One of them sported a half-mile-long train of black smoke as he curved away below us, but our gunners didn't claim credit. They said someone in a ship ahead probably earned it.

Bomb bay doors open—steady!—and bombs away! The doors were shut as quickly as possible and our skipper put the heat on. From that moment, with our throttles forward and the formation taking evasive action, the Jap attempts were laughable. Their fighters couldn't overtake us at our altitude and the flak trailed us.

We flew right over the center of Tokyo—but fast, and still taking evasive action—and I could look down and see the dock area where I'd landed one day in 1936. Then it had taken 17 days from California but this time my total flying time U. S. to Nippon had been less than a day and a half.

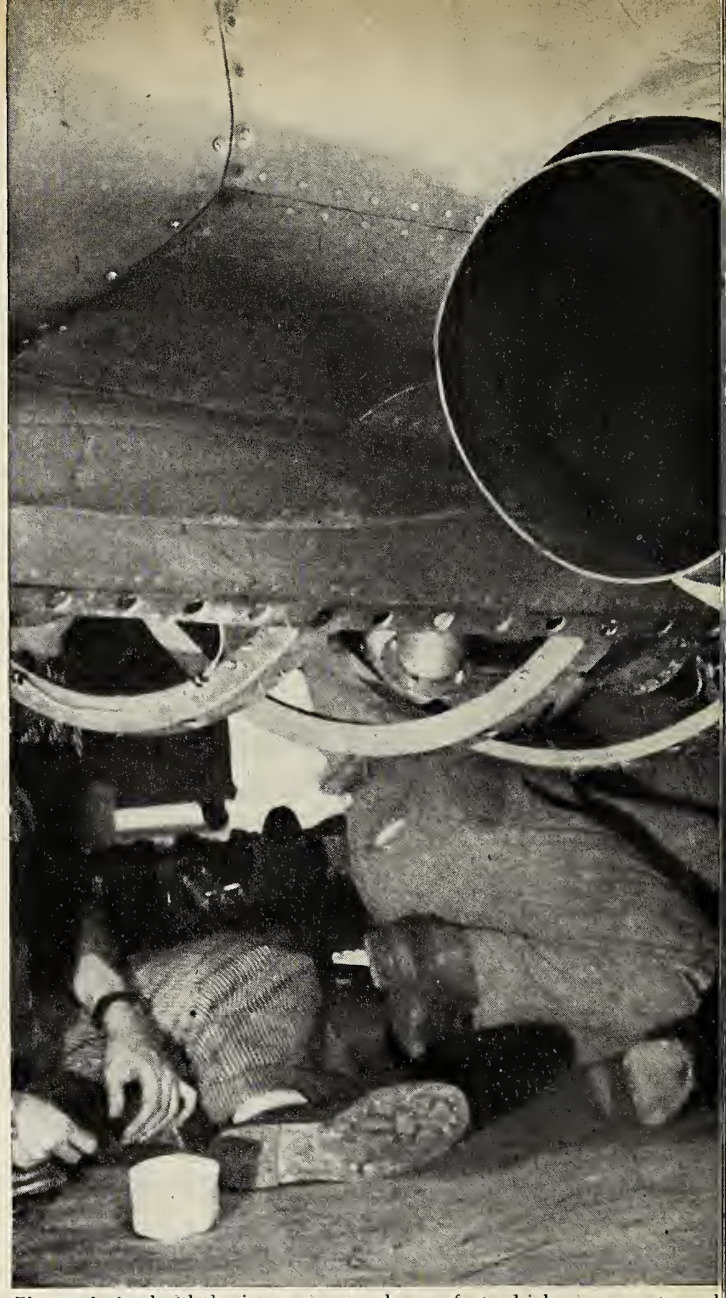
Pretty soon we were over-water again, and our 24-year old airplane commander gave the ship to "George" and lighted a cigar. The bombardier went after his fingernails with his pocket knife—he'd been interrupted halfway through—and the radio man tried to pick up Tokyo Rose who had broadcast that "60 hours after the first bombs drop on Tokyo there won't be an American left alive on Saipan." The best we could get was a program beamed in Spanish telling about the raid Flak suits came off one by one, and we kind of grinned at each other. The copilot sighed and summed up what the whole crew was thinking. "Well," he said, "I hope to hell they're all like that." ☆

Almost Too Simple

BY S/SGT. EDWARD T. WALLACE

AIR FORCE *Staff*

Ever wonder about servicing a jet plane? Here a jet crew chief gives you the lowdown on how the job is done



Eleven bolts hold the jet engine in place, a fact which gives most mech

S/Sgt. Earl Kohler pointed to a trim Mustang parked a few yards away. "Now, take an obsolete old plane like that," he said. "Without propellers, it can't get off the ground."

With that smug judgment, Kohler turned back to his mechanics who were installing an engine in a jet-propelled fighter. But the remark had not been lost on a P-51 mechanic who was passing nearby. The man stopped and glanced at the strange engine being swung into place. He squatted under the wing a moment and examined the flame tube.

"How does she look, Bill?" Kohler asked proudly.

"Well," said the Mustang mech, "I'd call that a plumber's nightmare."

Since that day, mechanics on conventional fighters and bombers have asked Kohler and his crew a million questions about servicing the jet plane.

"They want to know what wrenches we use. How long it takes to pull an engine. How the jet works. One guy even asked if it uses fuel. All kinds of damn fool questions."

Kohler, who operated a garage for 15 years at Jeffersonville, N. Y., was one of the first AAF mechanics chosen to work on the original XP-59A jet plane while it was being put through months of tests in the California desert. After the project was revealed, he was sent to Wright Field to keep the planes in shape for training and further experiments.

"Every mechanic gets a funny feeling when he first sees the jet job," Kohler says. "I remember what I thought. I said to myself, 'Hell, this thing won't fly. There's not enough stuff.' But after the jet took off a few times, I began to get the idea."

Mechanics trained on Thunderbolts, Lightnings, Marauders and Fortresses—any of our aircraft with conventional engines—have learned to think of power in terms of solid machinery, Kohler explains. In a conventional engine everything is solid and tight. Mechanics think in terms of complicated wiring, ignition, gauges and cylinders, elaborate fuel systems. Everything is complicated.

"But in the jet plane everything is simple," Kohler says. "You put in six quarts of oil, just like an automobile."

The cooling system is just a couple of oil jets which spray lubricant and air into the two rotor shaft bearings. The oil is standard hydraulic fluid 3580. The excess runs down and forward into the accessory section, and is returned by a small seavenge pump. The system is cleaned by a Cuno

first surprise. Men who have been accustomed to thinking of aircraft power in terms of bulky, heavy cylinders find tubes of thin steel.

filter. The generator, fuel pump and starter are the only accessories carried over from the conventional plane, and the ignition is even more simple than the oil system. There are only two spark plugs, located in the No. 4 and No. 8 combustion chambers.

The other chambers are interconnected and ignite from these two. After the unit is started, combustion continues without further assistance from the plugs. Combustion is as steady as the flame of an oil furnace. Plugs last as long in the intense heat of the jet as they do in a conventional engine. In the jet their spark gap is considerably wider.

Kohler and his men work on the P-59A, which must be classed as a training plane in the jet field. Yet, with few exceptions, their experiences would be applicable to any jet aircraft.

"We use about a fifth as many tools," Kohler explains, "and maintenance of a jet plane is less than a fifth of what it is on the other kind. As for the engine, it's so damn simple I can't understand it.

"Air comes in the front end, goes through the compressors, mixes with kerosene in the combustion chambers and is ignited. It blasts out through the flame pipe, and that's all there is to it. How the hell that makes an airplane fly, I don't know."

Engineers, explaining the jet force which drives a plane, have compared it to the strong, sudden whip at the nozzle of a garden hose when water is turned on full force.

"Most mechanics are surprised to learn that there are only eleven bolts holding the engine in place," the sergeant comments. "And not very big bolts at that. In the engine there are but two main bearings and one shaft.

"I can pull an engine with an inexperienced crew in 35 minutes, and four men can pull both engines and install new ones in a day. Where we used to spend five days doing a certain job on a conventional plane, we can do the same thing for a jet in a day. Where other mechanics would use 25 wrenches for a certain type of job, we generally use about five."

All the equipment necessary for changing a jet engine can be carried in the plane, and this consists of a small wing hoist and frame, and a cradle to support the engine when removed. With the engine located directly beneath the wing, the hoist is set up over an access door, through which the chain is lowered to the engine lifting lug. Three engine mounts are unbolted, the connections are unjointed and the

engine lowered straight down two feet or so to the cradle.

Since the unit is so close to the ground, no work stands are necessary. Neither are cranes, large hoists or powered equipment. The most necessary equipment is the familiar garage-type "creeper" or wheeled slat for prone work. Engine connections are few and simple: fuel line, oil line, tachometer and generator connections, and two thermocouple leads, one to the tailpipe and one to the main shaft bearing.

Mechanics invariably ask about the jet exhaust and want to know how close a person can stand in front or behind the engines, Kohler says. Most of them have heard of fanciful stories about women having their dresses whisked off by the suction of air going into the engines. And there is one story, widely told, of an officer who tried to look into the rear end and got his cap visor scorched off back to the eagle. Kohler does not believe these tales, but he

Rare is the pilot who does not like the jet propelled aircraft. Its new simplicity brings airmen back to stick and rudder flying.

does know a guy who stepped into the exhaust and was kicked back 70 feet in fast somersaults.

"I'd say a person should keep at least 200 feet behind a jet engine when it is blasting," the sergeant recommends. "You can stand closer without getting hurt."

Unlike conventional planes, the taxiing P-59A cannot be steered by goosing up one engine and then the other. The units are too close to center for enough offset effect. Steering is done entirely by brakes, and the plane will taxi in a straight line on one engine, just as it will fly on one jet unit with almost no compensation on the controls.

With a jet-propelled airplane, ground crews are spared the usual warm-ups required by conventional planes. The pilot can take off a minute after he presses the starter button and, once a flight is over, mechanics don't need to let the plane cool off before beginning work on the engine. By the time they get the cowling off, the engine is cool enough to be taken out.

There are reports that one plane landed at an experimental station, underwent an engine change and took off again within 30 minutes. Kohler and his crew don't believe it, but they know some also unbelievable records will be established when the pattern of jet service has been completely standardized. The simplicity of the engine will do away with much of the mechanical tinkering which is now performed on conventional airplane engines, and it may be that jet maintenance will become a sort of refill job rather than a conventional on-the-line task. That is, "maintenance" may be done in a factory, with ground crews removing worn-out units and replacing them with new ones.

Development of the AAF jet plane, one of the best kept secrets of the war, took place at Muroc, Calif., where Kohler said he signed away his life every day. "Everytime I turned around I was signing something, promising to keep my mouth shut."

Even the commanding officers at an AAF base nearby did not know what was going on inside the restricted area of the desert. Pilots were forbidden to fly over it and no amount of rank could get a curious officer into the field. On several occasions, the jet plane was seen smoking through the sky and frantic telephone calls came from the neighboring airbase notifying jet crews that a burning plane had fallen on their field. The callers were politely thanked for their concern.

One afternoon, when the experimental plane was smoking heavily, the neighboring airbase called out its fire and crash equipment and sent it clanging down the highway to the secret station. The crash wagons pulled up at the main gate and demanded to be let inside, drivers shouting that they had the location of a burning plane.

Again, the guards were compelled to thank them quietly and politely—and keep the gates locked. On another occasion a bird colonel became so curious that he drew himself up to full height before the guards and demanded to know what was going on behind all the secrecy and mystery. A security officer was called to pacify him.

"Colonel," he said, "Behind those hangar walls is the hope of tomorrow. We are coming out with a gadget that will revolutionize the sewing machine."

The jet plane, accepted after its performance in sandy country, showed no more damage to impeller and turbine blades than would be caused to ordinary turbo units. Absence of a propeller up front greatly reduces the amount of dust thrown up, and what does come into the intake merely passes through with the air, most of it being burned. The plane is now undergoing winterization tests in Alaska, probably concerning fuel viscosity and fuel problems, since kerosene does not act like gasoline at low temperatures.

Perhaps the simplest function of jet maintenance is servicing the plane with fuel. This is no more involved than calling the kerosene truck and filling up, but for jet engines the fuel is thoroughly filtered to safeguard the barometric fuel controls. These units do what the regulator on a turbosupercharger does,—they maintain a constant power with changing altitude. The engine can operate on nearly any hydro-carbon fuel such as gasoline, kerosene, alcohol, and even hair tonic or brandy.

At present the engines make a heavy drain on the plane's fuel supply at low altitudes, but they use about half as much at extremely high altitudes, where consumption is about the same as the gasoline used by conventional engines.

Pilots making their first jet-propelled flight should not expect to be flattened against the cockpit as they swoosh away like a signal rocket, but all who have flown the plane are impressed by its performance at high altitudes. The most experienced of them say the jet has brought piloting back to stick and rudder simplicity. Instruments are the same as in any other plane, except for one major difference —instead of manifold pressure there is tailpipe temperature. This is a measure of power output, and is balanced

(Continued on Page 42)

Into Hidden Valley

BY CAPT. MANFORD SUSMAN

AIR FORCE Overseas Staff

A C-47 comes in to land on the newly completed airstrip built in Hidden Valley, 5,000 feet up in the mountains of New Guinea.

We needed an airstrip in the wilds of New Guinea. Captain Susman, who went in with the gliders, tells how we persuaded the cannibals to help us build it

I looked back into the fuselage of the glider as we circled over the high country of New Guinea and tried to smile at my fellow passengers—four burly blacks wearing the khaki uniforms of the Australian Native Administration. They couldn't see out but they knew what was going on and were just as nervous as the rest of us.

Below us, another glider—the first of four—was just banking in for its landing. I could see its shadow grow larger and larger against the tall, green Kunai grass. In a moment we'd have the answer to our $64 question—what was under that grass. In three seconds we'd know if it was smooth, landable meadow, or rocks. Or swamp. In two seconds. In one second—touchdown!

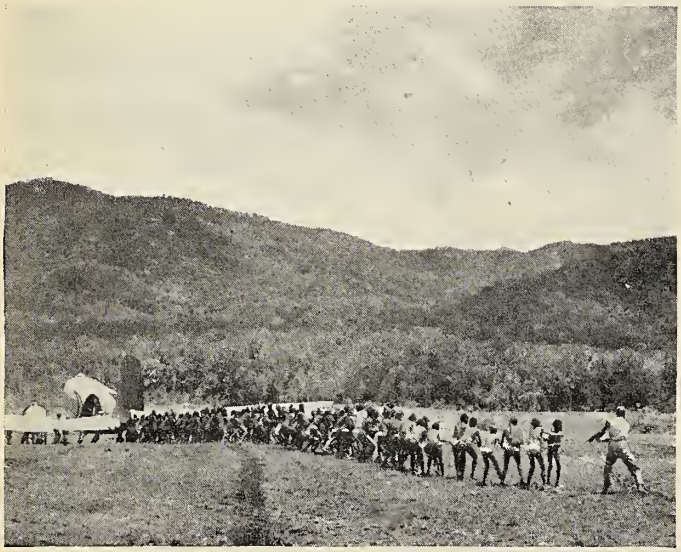
Looking down, I saw the nose of the CG-4A bite into the ground, slither along a few feet, and then stop. A pause while all of us in the air held our breath, and then the fuselage door opened and men scrambled out. They looked up at us, waved their arms reassuringly and fanned out into the grass to reconnoiter for the landings of the remaining three gliders.

Within a few minutes they had their walkie-talkie in operation and were sending us vital information: condition of terrain, wind direction, where to touch down. It seemed that the Kunai grass covered good hard ground and their only warning was to come in at a higher landing speed than usual because of the 5,000 foot altitude of the valley floor.

We were over the first hurdle and life looked much brighter now that we knew we had a good place to land. The nervousness had come from the knowledge that, after a four-hour tow through mountain passes, our tugs didn't have enough fuel to return to base with us. There were no possible landing spots, except Hidden Valley now below us,

Native police were brought along in the gliders to furnish protection and assist with the heavy labor of building Eunice Airstrip.

These people were too primitive to be interested in trinkets or money, but they did agree to work if they were paid with salt.



The natives are small of stature, but when enough of them pulled together they were usually able to accomplish tasks given to them.

Proving that he can go along with civilization, this Kukukuka acquired a fatigue cap from a mechanic and sat himself in a chair.

within hundreds of miles, and between us and the only strip our tugs could land on was another, higher range of mountains—over which C-47's could not possibly tow gliders. In other words, we'd land safely in that patch of green, nestling between 13,000 foot peaks—or else we'd land unsafely. But land we had to.

Of course we had reconnoitered, photo-reconnoitered, and just plain buzzed the area for weeks trying to see, but we couldn't make sure. There were lots of questions, and one unescapable fact—as operations in the Philippines stepped up, more and more aircraft had to fly north over the New Guinea hump. It became imperative that we establish an emergency landing strip, an AACS station, and a weather detachment in the middle of the jungle. Too many pilots were taking off to fly that stretch of wilderness with no idea what weather conditions to expect, and with no communications after they got out of radio range of their take-off point.

Engineering personnel flew over the area and put the finger on Hidden Valley for the very obvious reason that it was the only level ground within hundreds of miles. And then Chief Engineer GHQ SWPA was asked to construct an airfield there. After discussion with operations officers of Far East Air Forces, the Chief Engineer decided that gliders were the only answer.

So there we were, four glider loads of us, being cut loose one by one to descend into Hidden Valley, and now it was our glider's turn. I saw our pilot reach for the tow release handle over the windshield. He pulled and there was an impulsive, headstrong little movement from the glider and then we turned and started down.

We landed perfectly, as did all four gliders. In addition to the four glider pilots who had brought us in so beautifully the party consisted of twenty blacks and five whites. There were Squadron Leader Michael J. Leahy of the RAAF, in command; Major Wainwright, medical officer; Sgt. R. Fraser Angau, in charge of the blacks; T/T Michael Savko, radio operator, and myself.

On the way down we had noticed some natives crouching in the Kunai grass around the edge of the valley and we hoped they were friendly. No white person had been in the valley since 1938, and no blacks had come out. Consequently, no one knew if the Japs had infiltrated into the area or if the natives were armed. One thing we did know for sure—we needed native labor to build the strip. Our interest in this fact was intensified when we realized that there was no way out of Hidden Valley for us until the strip was built. So it was with considerable apprehension that four of us, plus the colored interpreter, headed toward the nearest group of villagers.

The interpreter said he wasn't sure he could speak the local dialect, and as we got close enough to make out what kind of people we had landed among he became even less sure. While we had expected to find a kind of hill native noted for his large size and comparatively advanced civilization, we found ourselves looking at wizened, pygmy-like people wearing no clothing at all except over their genitals. The interpreter swallowed hard and whispered, "These people are Kukukukas!"—naming the most fierce and treacherous cannibals in the interior of New Guinea.

It was a bad few minutes, but finally our interpreter managed to get across the idea that we came in peace. We later learned that the cannibals were not particularly frightened of us because, seeing no bows and arrows in our hands, they assumed we were unarmed. When, the following day, we gathered the villagers together for an exhibition of firearms (to discourage any thought of ambush) their amazement knew no bounds. They were openmouthed at the disintegration of pumpkins and tin cans, but perfora-

tion of one of their battle shields by a .30 caliber slug caused a completely different reaction. They babbled and screamed at our interpreter who finally told us they wanted our help in their war with a neighboring village. In return they'd let us eat most of—or even all, if we insisted—of the enemy warriors. The poor interpreter spent another bad few hours trying to explain to them that to get the United Nations on their side they'd have to go through channels.

Mild as they were, our troubles with the cannibals were the worst we had Although our gliders were crammed with items for trading—shells, trinkets, mirrors and salt—so barren were these peoples' lives that they wanted almost nothing. Still existing in the Stone Age, using no metals of any kind, they sleep on the bare ground in pitiful huts, prepare food by simply throwing it into a fire. They can't even be forced into things, because they have no fear of death, visualizing heaven as a happy land so full of possums you can burn them like firewood. Their acquisitive instincts are completely undeveloped and none of our trinkets interested them at all. Salt was our best item of barter and by using it we finally got some of them to work. Salt became the medium of exchange. The natives were very clumsy with tools and constantly cut and bruised themselves. But three days of clearing, draining, levelling, filling —and cursing—had us a strip suitable for L-5's. The following day two L-5's landed, carrying gas for their return trip in the rear seat. We named the field Eunice Airstrip and the L-5's went to work ferrying out the glider pilots.

We'd run out of salt and needed various other supplies including meat In the beginning we'd tried to buy pigs from the natives, but met a peculiar resistance to the idea. It seemed that their pigs were their most prized possessions and they had no intention of parting with them. Our interpreter explained that we needed meat, and they seemed to understand. Muttering that they'd be right back the party of natives disappeared toward their village. Our mouths were watering at the thought of some nice fresh pork—and then they returned. With them were several girl children from the village. "Meat," said the headman happily. "Meat for you to eat."

We radioed for more salt and some kind of eatable meat. It arrived by parachute, as did many of our supplies thereafter, without the loss or damage of a single package.

More salt meant more workers and the strip progressed. Two weeks after our arrival, a C-45 landed bringing supplies and personnel. In the party was the Chief Engineer responsible for the construction, Brig. Gen. J. L. Sverdup, and the Air Surgeon of the AAF, Maj. Gen. David N. W. Grant, who wanted to observe the general health of the Kukukukas with reference to jungle diseases. With drainage and clearing of the strip completed by hand, we requested mechanical equipment to help us complete the job.

It arrived in two gliders carrying a bulldozer, a road-scraper, and operating personnel. Within a few hours the machines were at work. When the bulldozer's engine started the Kukukukas were astonished when it failed to take off and fly away. In another week—approximately three weeks after the initial touchdown—a C-47 landed with fuel for the scrapers, medical supplies and a few essential commodities like mail from home.

Today Eunice Airstrip is a going concern which has considerably reduced the hazard of flying the New Guinea Hump. There's a regular milk run plus quite a few casual landings, and the weather boys and the AACS station are installed for a long stay. As for the Kukukukas, they're at work on an official request for the United Nations to lend them soldiers to fight their neighbors in return for a number of potbellied little girls "suitable for eating." ☆

Kukukuka maidens are a little on the solid side and a waistline was as hard to find in Hidden Valley as a Coca Cola machine.

Drainage ditches were dug immediately. A week after the gliders arrived, the Air Surgeon came to observe the health conditions.

The natives were somewhat disappointed by this bulldozer. Every other machine had flown. They thought it would soar away.

THIS IS YOUR ENEMY

. . . it's your life or his

Ruse de Guerre. A high-ranking Allied officer, an observer on a bombing mission over Nazi Europe, was wounded and rendered unconscious when the plane was struck by enemy fire. Coming out of the coma, he found himself in a hospital. Around him were British-uniformed doctors and nurses. On a nearby table was a London newspaper.

One of the medics, identified by his insignia as a British colonel, explained that the flak-riddled bomber had managed to limp back across the channel, only to crash near the English coast. He congratulated the observer on his narrow escape from death, adding, with a sigh, that all others aboard had been killed.

After asking the wounded officer routine questions concerning his unit and base, the colonel launched a conversation which revealed he was deeply interested in air operations. Not at all reluctant to discuss the subject with a fellow officer, the patient brought the doctor up to date on several phases of Allied strategy.

So expertly was the little drama staged that the invalid did not know until later that the "British" doctors, nurses and newspaper all were props. His plane had crashed in German territory and he was in a prison hospital.

Rarely, of course, are conditions so perfect for a finesse by the enemy. Granted that their clever handling of the important prisoner once more demonstrated the ingenuity of their interrogation methods, it is not to be expected that all their captives will remain so obligingly unconscious until the trap is baited and set.

Many other instances on record, however, indicate that even when a POW is in full possession of his faculties, the Germans have a bagful of tricks calculated to extract more useful information from him than the bare name, grade and serial number he is required by international agreement to reveal.

Both the Germans and Japanese lean heavily upon psychology in their interrogation techniques. By various ruses, determined by their conception of a prisoner's personality, temperament and national traits, they seek to draw him into conversation. If they can get him to talk about anything at all, they feel they may dupe him into dropping a remark which to him may seem innocuous but which for them may be an informational fragment they can piece together with other scraps to form an operational pattern.

The Japs, as might be expected, stick pretty much to a set formula. Knowing the average American is a friendly, impulsive sort under normal conditions, they work on these characteristics. Their initial stratagem is a pretended spirit of camaraderie. Usually, a Jap intelligence officer, left alone with the prisoner, strives to gain the latter's confidence by handing out the hokum that he respects him as a fellow man-at-arms and by advising him that he may as well make the best of things, just as he, the Jap, would do if their positions were reversed.

After providing him with tobacco, confectionery and other comforts, the Jap shares a good meal with the American and attempts meanwhile to get him to discuss his civilian occupation or something else unrelated to the war. The dodge is intended, of course, to high-pressure the prisoner into the belief that the Jap interrogator is a good guy. If the prisoner consequently lowers his guard, he may be hoodwinked into saying something the enemy can use to advantage.

Failing to achieve the desired result by the "friendly" approach, the Japs try through misrepresentation to undermine the prisoner's faith in his government and home-front. Employing the old propaganda line that the U. S. has no legitimate reason for fighting the Axis, they argue that the U. S. provoked the war only to pull Great Britain's chestnuts out of the fire and that it is intentionally prolonging the struggle so that American "big business" may increase its wealth.

The Japs contrast the prisoner's plight with the lot of most American civilians who, they assert, are enjoying the war and don't want to see it end because excessive profits and high salaries and wages have brought them unprecedented prosperity.

Further distorting the facts, the Japs declare the Americans at home have demonstrated their unwillingness to cooperate with the armed forces by their participation in labor strikes and by their failure to buy war bonds and to give blood for plasma.

Then appealing to the captive's self-sympathy, the Japs ask him why he should be separated from his wife or sweetheart when "so many other men are at home." In this connection, they also try to sell him the idea that moral corruption among American women is widespread.

If the Japs can instill even the barest suspicion in the prisoner's mind that he is the "fall guy" of the world situation, they may have a vulnerable subject for future interrogation, for he may brood over the matter until he convinces himself that perhaps there is something in what they've been telling him.

Should he show no sign of falling for their deception, however, the Japs try a third tack. Having established that the prisoner's confidence in his nation cannot be shaken, they endeavor to twist this loyalty to their advantage by needling him with contemptuous and derisive remarks about the ability of his leaders, the effectiveness of their strategy and the quality of U. S. equipment. The American's natural impulse is to resent these attacks and, unless he holds himself in check, he may blurt out something the Japs would like to know.

Unable to get a rise out of the prisoner by any other means, the Japs finally resort to intimidation. They may threaten him with solitary confinement, starvation, refusal to make him available for prisoner exchange, deprivation of usual privileges such as sending and receiving of mail and even torture. Such threats, however, rarely are carried out.

The Japs size up the Briton as an inherently skeptical, cautious and cold person and they waste little time on him with the "good fellow" technique. Instead, they concentrate on what they consider his distrustful nature, usually telling him that American soldiers in England are committing atrocities against British women. By such falsehoods, they hope to rile the Briton into revealing something that may hurt the Americans strategically.

The Germans, on the other hand, feel that any information they may succeed through craftiness in obtaining from the Englishman is accurate, while the American is more inclined to exaggerate.

Upon taking a prisoner, the Nazis ask him to fill out a personnel form, which calls for information on his unit and his mission. Should he be unwary enough to comply, the Germans then know they have an easy mark and their further interrogation is based on the completed form. The captive who rejects the form and refuses to volunteer more than his name, grade and serial number is the one the Nazis seek to outwit psychologically. By observation and analysis, they determine the approach to which he's most likely to respond. They may decide one type of prisoner can be primed by introductory conversation about pre-war times, offers of cigarettes and liquor or a promise to notify his family that he is alive, while another can be influenced by the lie that others in his party have already talked or by the threat that his superiors will be informed that documents, which he should have destroyed, were found in his possession.

Often the German interrogators will boast about their own weapons and express doubt concerning those of the Allies in order to lure technically-minded prisoners into talking. For the stubborn captive there is prescribed what the Germans call "rougher treatment . . . within the limits of the Articles of the Geneva Convention" or a lengthy solitary confinement.

Should they succeed in "cracking" a prisoner, the Germans usually inquire about Allied propaganda training, military and civilian morale, the supply situation, popularity of Allied leaders, conduct of American soldiers in England and of the people of liberated nations, and the effect of Nazi reprisal efforts in occupied territory.

Stool pigeons and hidden microphones are planted by both Germans and Japs to pick up unguarded remarks by prisoners. It is supposed that the stool pigeon system can be used more effectively by the Germans than the Japs, for it is hard to imagine a monkey-faced Jap successfully disguising himself as an American or British POW, and so far as is known the Japs have few renegade white men in their employ.

". . . German train whose function had been to serve as a complete flak site."

Flak Special. Our ground forces in France recently found an abandoned German train whose function had been to serve as a complete flak site. Boxcars had been converted to provide headquarters, living quarters for the gun crews and others, a kitchen, gun repair shops and storage for ammunition and supplies.

Also on the train were four 128 mm flak guns, four 20 mm light flak guns, a predictor-range finder and two radar sets. Some of the cars had sides which could be

THIS IS YOUR ENEMY

dropped when necessary to permit full rotation of the equipment.

The Japs, too, make use of railroad flak cars, especially in Burma and Thailand. They place among the ordinary freight cars of a train a special flat car with light antiaircraft guns and sides of armor plating. When our planes come over, the gunners open up.

Air-to-Air. Japanese air-to-air bombing, often reported in AIR FORCE, has increased lately. In one recent mission, U. S. aircrews reported several dozen such attacks. Most of the bombs were released in level flight from the front, a few in dives or banking turns. Besides the familiar phosphorus bombs, a number of odd missiles were noted. These are the nicknames and descriptions as given by the crews:

Stove pipe—A cylinder, two to three feet long, on a small parachute; exploded with a puff of black smoke.

Orange crate—Container for butterfly bombs.

Ball and chain—Cylinder flat on ends, with black ball connected by chain three times the length of the bomb; burst similar to phosphorus.

Super-Simple Men. Lt. Gen. Katsuzo Kosuda, former head of the Japanese Ordnance Administration and now director of Japan's manufacturing, said recently:

"The mechanical skill of Japanese conscripts is considerably lower than that of American conscripts, and for that reason it is desirable for us to have weapons of more simple construction than the Americans."

Nazi Mosquito. The Germans have a counterpart of the British Mosquito. It is the FW-154, constructed of wood except for light alloy control surfaces. The plane has two engines and carries a crew of two, sitting side by side. It has two 132-gallon wing tanks and a 264-gallon fuselage tank. Armament includes 20 mm and 30 mm cannon and rocket tubes beneath the wings.

Lion vs. Hare. A recent statement by Japanese Imperial Headquarters informed Jap airmen:

"The enemy's wealth of planes is astonishing, and he is safe as long as he can produce the armament, armor and other self-protection and safety devices for his planes. The high-altitude performance of enemy planes seems to have been remarkably improved recently. It is important that we plan, instruct and train in detail how to lure enemy planes with super high-altitude performance down to the level at which we want them and there to force combat on our terms." Then this word of caution was added:

"Though they (Americans) are our enemy, we must admit their maneuvers are superb . . . our pilots have carelessly made light of the enemy, only to be caught napping at times by these unskilled novices. We must be more vigilant and adopt the caution and resolve of a 'lion fighting a hare' regardless of the size of the enemy's force." In conclusion, Jap airmen were told they should not be overwhelmed by "the superiority of (American) equipment" but should concentrate more on "skillful piloting and many elaborate flying tactics."

". . we must admit their maneuvers are superb . ."

More Guns for Jerry. The Germans are putting more and heavier guns on their planes. An FW-190 which was shot down recently over France carried four 20 mm and two 13 mm guns. One 20 mm was located in each wing root and one in the leading edge of each wing in the position previously occupied by Oerlikon guns. The two 13 mm guns were in the cowling above the engine.

More Planes, Less Oil. German aircraft production has increased materially since last March. It may continue to increase.

A major reason is the change in Allied strategy early last spring. German aircraft plants by that time had been well battered. Production was at a low point. It was time to concentrate on other parts of the German war machine. So the Allied high command moved aircraft plants down on the target priority list and oil installations up. Although aircraft plants have been attacked periodically since, they have taken nothing like the beating they took early this year.

Another reason is the German's dispersion effort, which finally has shown a degree of success. Production machinery has been set up in many unusual locations, including hangars at operational fields, textile plants, carpet factories, farm buildings and underground.

Tall Tale. Baron Munchausen would have turned green with envy if he could have heard a radio broadcast beamed the other night from Tokyo to Australia. The speaker was Lt. Yoko Endo, a Jap fighter pilot, who modestly described the ease with which he is knocking-off AAF B-29s.

"As I soared into the skies to meet the fools, as we call the B-29s, I swore to kill as many pilots as I possibly could," he began. "I shot a withering burst of machine gun fire at an enemy plane in the first formation and there went the daredevil into the sea.

"Now for enemy plane No. 2. It was not hard to make it a target of fierce and accurate fire. This daredevil soon began to emit smoke from its right side, and losing both speed and altitude, it suffered the same fate as No. 1. Thus two daredevils met their deserved fate.

"And do you know what happened to the three remaining fools? They were thrown into utter confusion by the death of their comrades and fled helter-skelter—a sure indication of the deteriorating morale of American pilots.

"Another formation of five fools came into view. Bristling with fury, a much-vaunted B-29 put up a heavy screen of withering fire. But I gave it a crack shot

which soon caused it to waiver and lose altitude. It was a pitiful sight to watch the enemy desperately trying to save himself from inevitable death by jumping overboard.

"I was disappointed because the other B-29s turned tail and fled. I cursed at such cowardice and immediately took pursuit. Diving on them from above, I let go a blast of machine-gun fire so accurately that it blew off the tail of the first plane and the enemy pilots could be seen covering their faces with both hands.

"I could not give the finishing touches to the enemy planes, having used up all my ammunition. So the only alternative was to crash-dive on them. But fate intervened. My plane suddenly developed engine trouble and began to lose speed. The distance between me and the enemy widened and I was forced to give up the head-on crash."

Army-Navy Games. The traditional cleavage between Japan's army and navy has been widened by recent Jap reverses in the Pacific. The army blames the navy for its shortage of fighting supplies. The navy complains when the army fails to hold out until supplies come.

This disposition of the services to censure each other is not due entirely to the nervousness of defeat. Each is actually suspicious of the other. They have been so since 1868, when Japan's feudal system was overthrown and her monarchy restored.

At that time, the rulers of Choshu province, westernmost part of Japan's mainland, appointed themselves principal protectors and builders of the Japanese army. Choshu province long had regarded itself as a bulwark against invasion from the Asiatic continent and had maintained a fully equipped army of its own.

At the same time, leaders of the Satsuma province, on the southern tip of Japan's most southerly island of Kyushu, became leaders in building the Japanese navy. Satsuma men long had been sea-going traders.

In succeeding years, these two strong but traditionally different factions extended their interests beyond war machines to scheme against each other for control of state affairs. The Satsuma-controlled navy became the more popular service, but the Choshu-dominated army won greater power in government.

The army and navy usually have had the same national aims, but political rivalry and distrust between the services have continued.

The Jap navy ministry recently made this official report of a current and typical army-navy quarrel:

"A marked difference between the living standards of army and navy forces in defense outposts has arisen. The inequality of standards is causing ill-feeling on the part of army forces—a factor which is likely to injure inter-service cooperation. An immediate and thorough investigation of this army-navy rift is therefore felt to be imperative."

Jet Strategy. The German ME-163 fighter is a dangerous opponent. Here is a summary of its tactics:

Most attacks have been dives from almost straight above, steep climbs from very low, or gliding tail attacks.

A jet nearly always circles back for a second pass.

On tail attacks, ME-163s close no faster and perhaps a little slower than an ME-109 or FW-190, but they are extremely fast in climbs and dives.

Jets often come in from 5 o'clock, hit the left wingman of the second element of the low squadron from inside the formation, and break away around 9 o'clock.

They sometimes make high nose attacks, then climb again for high tail attacks. One made a high tail attack, broke away at 9 o'clock and circled back for a climbing attack from 5 o'clock low.

ME-163s make up-and-down, fly-through attacks. They barrel up through a formation, roll over a few hundred feet above the bombers, then dive down through the formation.

"... They barrel up through a formation."

A trick of the jets has been to get behind a bomber formation, climb almost straight up to a point several thousand fect above, then loop over into a diving tail attack.

Jet fighters cannot always be spotted by their contrails. Some attacks are made in a glide with the jet off. Even when the plane is climbing under power, the contrails may be thin. ☆

OUR AIR-GROUND
Trouble Shooters

Air Support Party officers are key men in the steady grind forward into Germany's Westwall

BY S/SGT. MARK MURPHY
AIR FORCE Overseas Staff

BY CABLE

Through the broken walls of a hayloft converted into an advanced observation point in northern Germany, you can watch P-47s as they bomb and then strafe colored smoke that artillery laid down some 100 yards away. And then through glasses you can see infantrymen running, falling, running, falling, running over the area the Thunderbolts bombed.

This war we have now in Holland, France, Belgium, Luxemburg and Germany is tight and tough, with men dying for every yard. Every day the planes can get off the ground they are out there, bombing and strafing anywhere from 100 yards to 100 miles in front of the ground troops going east.

Down around Metz the fighter planes ripped up troop and armor concentrations, broke lines of retreats, beat up command posts while the infantry clambered over sod-covered forts and blew out doors, ventilators and Germans with fire and explosives.

All up and down the front the combination of ground and air is working, and some of the men most responsible for the teamwork are the Air Support Party officers with each division and combat command of the ground forces. They are AAF men, all of them pilots or observers, and each of them trained in ground warfare. They work with the G-3 or S-3 for air in the units they are attached to, and their job is to see to it that the 9th Air Force gives the ground all the help it can, that ground commanders understand the problems of air warfare, and that things are worked out so air power is neither wasted nor asked to do the impossible.

The job is not at all an easy one because the misunderstandings between ground and air can occasionally reach great depths. Weather causes about as much dissension as anything else. One day, for instance, in the 9th Army sector across the Netherlands border in Germany, Lt. Col. Joseph C. Foeht, Air Support Party Officer with the 2nd Armored Division, kept getting requests for some air coordination.

"We can't get enough planes up; our fields are closed in," he said.

"But damn it, the Heinies are strafing us," the ground officer wanting the help said. "If they can fly, why can't you?"

"Maybe their fields aren't closed in," Foeht replied.

That was precisely the trouble. The German fields were open and ours were closed. The argument went on, and in about an hour some planes from our bases did get up and come over the 2nd Armored's territory, which by this time was covered over with fog and clouds.

The planes were released to go over a division they could see. Some 2nd Armored people were unhappy but not for long because they actually understood what had happened, and besides the 2nd Armored likes the 29th Tactical Air Command which cooperates with it. On another day the 1st Division, attacking farther south on the 1st Army's front, had close coordination all day, squadron after squadron of P-47s coming down and blasting towns, armor and gun positions in the Division's way. The going was hard because the Germans had dug in and fortified a little town during the weeks the Allies on the border were massing for attack.

There were communication trenches and tunnels among the 50 or so houses in the town, and there was armor massed in back of it. The division's artillery worked on the town; its infantry dug the Germans out, and the 9th TAC worked on the armor. Once they knocked out some stuff in the east end of the town, while the infantry dug in on the west. That was close coordination, and it was called for by Maj. Donald B. Yeager, Air Support Party Officer, who was told of the situation by the commander of the battalion taking the town.

Directing bomb-carrying fighters which helped the tanks, this 9th Air Force Air Support Party unit aided in the drive on Metz.

The misunderstandings mentioned occasionally in this article are being whipped by the teamwork between the two battle arms. Lots of times, airmen don't understand what goes down on the ground, either.

"Once in a while," Maj. Walker H. Mytinger, G-3 for air in the 2nd Armored, who works with Colonel Foeht said, "you get some squadron leader calling for smoke on a target, and then in 15 seconds he'll call back and ask why it hasn't been put down. He doesn't realize that it takes a few seconds for the request to be relayed to the artillery, either division or corps, that then the artillerymen must plot the range and deflection, and that it might take about 25 seconds for the shell to reach the target after it leaves the gun barrel."

Foeht and Mytinger work together in a battered room in a battered house near the divisional command post. Their room quivers continuously from concussions caused by nearby friendly artillery batteries. They have radio and telephone communications with the CPs of the combat parties of the division out in front. With the tank columns, other Air Party men work in tanks doing the forward spotting. They relay their requests to Foeht or else direct planes by radio themselves. Most of the fellows with these jobs are combat pilots on temporary duty of 10 days or two weeks. Some have been killed or wounded on such tours, and they all think the work is highly dangerous, which it is. The tank men think airplanes are unsafe, too.

Although the theory of air-ground cooperation is old and was worked superbly in Africa, many of the tech-

AAF pilots ride with armored units to coordinate tank and dive-bomber action. This airman speaks from a tank by radio with P-47s.

Teamwork such as this helped subdue Aachen and Metz, with the ASP officer working alongside ground liaison personnel.

niques in use now in the European theater have been developed since D-Day. Not all the officers work in the same way or have the same ideas of how their jobs should be handled. Capt. Albert G. Kelly, who was awarded the Bronze Star for his work with the 5th Armored and now is with the 6th Armored, doesn't like to observe from tanks and believes strongly that the Air Support Party man's place is close to a division or battalion command post.

"When you button yourself up in a tank," he says, "all you can see out of is a little slit. How in the hell can you observe air action from that?"

Focht, on the other hand, wants men up forward in tanks. Both Focht and Kelly are considered excellent Air Support Party Officers.

The Air Support Party men work with large scale maps of their sectors and also with huge aerial survey maps prepared by photo reconnaissance outfits. They will give a six-figure coordinate to a flight leader and then describe what the spot should look like from the air. A forward observer sometimes watches a flight coming over and tells it when to dive.

A log of missions is kept and a typical one of a good day is the following from Capt. Ray Fuchs, a 19th TAC controller during the recent 3rd Army advances:

1005—P-51 recco shows enemy activity in Ravine Wood.

1030—Thunderbolt squadron called in to bomb but flak drove off the mission.

1045—Thunderbolt squadron bombed Juville at the northern end of ridge with 28 500-pound general purpose bombs and incendiaries, strafed area.

1220—Reconnaissance Mustangs report new activity. Squadron of Thunderbolts called in to bomb vehicles on move. Vehicles dispersed and hid when P-47s came over.

This went on until dark and then the Black Widows came up to continue watching and harassing the enemy.

As could be expected, an Air Support Party officer soon begins to identify himself with the outfit to which he is attached, even though he wears a 9th Air Force patch on his sleeve. Maj. Martin L. Delong had had 85 sorties in P-51s when he was called from his base in England to be Air Support officer with the 35th Division in the 3rd Army.

"All the rest of my squadron have gone home now," he says with some regret, and he then goes on to tell about the time we really had some air-ground cooperation. It seems the Germans stuck an antitank ditch in our way and the Thunderbolts bombed and strafed the Germans until they took cover. The infantry and the artillery laid down covering fire and the engineers filled the ditch so the tanks could get across it.

They all soon get to feel themselves air-ground men. Colonel Focht, for instance, is a West Pointer, with both pilot and infantry experience. Captain Kelly is an old Navy pilot who has served both in the infantry and the AAF. Major Yeager is a trained observer who dropped on D-Day with the 82nd Airborne. They all become intensely curious about their work, and Colonel Focht quite often goes to the very front lines to check with battalion and company commanders on how the air is helping them. Once he led two correspondents into the middle of a tank battle, which they thought was too close, especially after their jeep tires got shot. At the front you learn what air means.

"God, if we had only had air," an engineer lieutenant colonel kept saying during the tough days when he was trying to get a bridge across the flooded Moselle River in order to get material and aid to the 90th Division which had crossed in assault boats and taken Konigsmacher Fort. It took four days for the bridge to be completed, and air could have knocked out the artillery which kept breaking up the work but the weather had been impossible for flying.

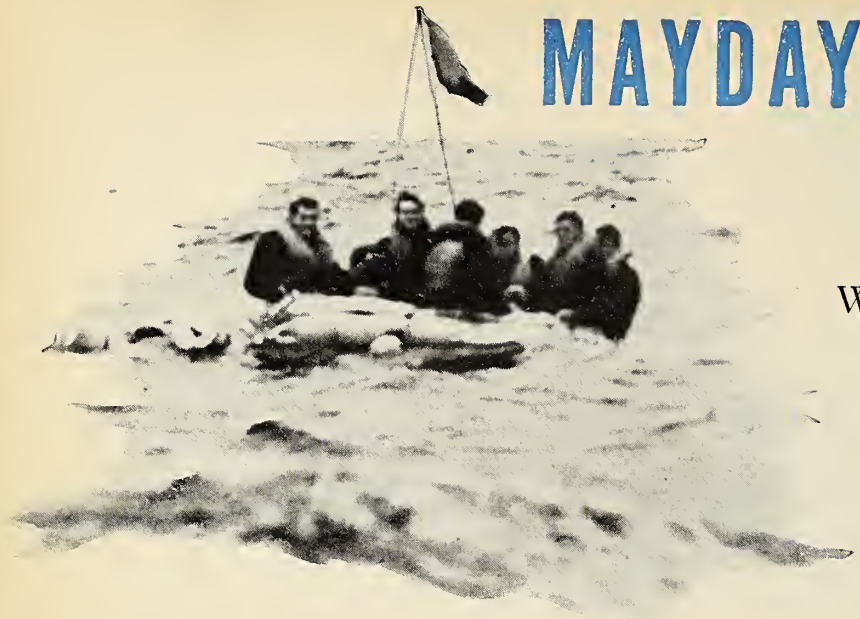
At another place, Lt. Col. Harry L. Hilliard, a battalion commander in the 2nd Armored, tells with delight how the Thunderbolts came down out of clouds to protect his tanks crossing an exposed field.

Infantrymen tell how they feel a lot better when the planes are up. "They can't pin us down then," one said.

The Air Support Party men are furnished planes by fighter-control, and communications between ground and air are of the highest importance. Planes must be released for other work if there is nothing for them to do, and they must be told instantly when a situation has changed. For these reasons, most messages are sent in the clear. A ground man sends word to a flight leader to go to a certain road and bomb vehicles moving east out of such and such a town. A squadron leader, having trouble locating a target precisely, will ask that artillery spot it with a certain type of smoke. The Germans, of course, are on to all this, and the controller and the pilots must always be alert for tricks. A couple of pet enemy stratagems are his spotting our troops with smoke in hope that our planes will bomb and strafe friendly soldiers, or his cutting in on our frequencies with orders for our pilots.

One legend, which oddly enough is true, is that of a squadron leader who was told to leave his mission and go to another town and bomb it. But he didn't go. The order had come through in perfect English and the message had been phrased properly. But the pilot couldn't recall hearing the voice before. "Sing Mairzie Doats," he demanded, and the voice couldn't, or possibly the announcer felt that that was too low for even an SS man to stoop. ☆

MAYDAY! MAYDAY



When the distress call goes out from a plane over the North Sea or the Channel, an amazing Anglo-American rescue service swings into action

A Mustang pilot of the 8th Air Force was on a bombing-strafing mission to the Scheldt estuary when his engine began to miss.

"I made a few passes and fired my guns," he reported, "but then the engine went real bad. I unloaded my two bombs on a barge full of German troops and turned for England."

Twelve miles or so from the Holland coast, over a stormy English Channel, the Mustang's engine conked out. The pilot jabbed the button, called his distress signals over the R/T and jumped from 9,000 feet, while overhead another Mustang circled the falling chute, transmitting radio signals by which a fix on the position could be obtained and rescue planes or launches dispatched to the spot.

Misfortune multiplied. The sea was extremely rough. As the pilot hit the water he slipped from chute harness and inflated his dinghy, but the waves were tossing so high he had trouble getting into it and more trouble staying in.

Presently a Walrus seaplane, manned by an RAF Air Sea Rescue crew, flew into sight and hovered above the dinghy a moment to survey the chances of landing. Somehow it got down.

"They tried to get close enough to haul me in," said the pilot, "but the rough sea made it difficult. The Walrus was being knocked about. Then, suddenly, the plane swept over me, pitching me out of the dinghy. I swam toward the tail, trying to avoid it as it heaved. The crew threw me a dinghy from the plane. As I climbed in, however, the plane hit me a second time and the dinghy was punctured. I was just about unconscious when they got a rope around me and pulled me aboard."

Barely had the pilot revived in the rescue plane when a wing snapped off the weakened Walrus, carrying away one float. Both crew and pilot had to jump into the water, where they bobbed around in their Mae Wests while the seaplane tipped and sank.

Again the pilot lost consciousness. When he came to this time, he and the RAF men were aboard a high speed launch heading for England. He had suffered minor injuries and shock from the chilling water, but a day in the hospital put him right again and he returned to duty.

This is not the happiest story that could be told about Air Sea Rescue in the U. K. It does, however, suggest the difficulties in this complex operation. It shows, also, the synchronization of effort between British and American forces. When that pilot shouted "Mayday, mayday, mayday" over his R/T (a phrase whose origin lies in the French *m'aidez*—help me) he set in motion one of the most complicated yet efficient services of this war.

The brain of Air Sea Rescue, as it applies to AAF operations, is situated in a mossy red brick building in East Anglia, the Operations Room of an 8th Air Force Fighter Wing commanded by Brig. Gen. Jesse Auton.

From this room are controlled all fighter planes of the Wing in various phases of their combat operations. In addition, the Air Sea Rescue unit—occupying a glass cubicle high in one corner of the two-story room—directs rescue work for the entire 8th Air Force, both bombers and fighters, maintaining contact with all agencies involved, whether they be AAF, RAF or Royal Navy.

This control center is a maze of maps, telephones and information boards. Controllers, wearing headsets and with computing instruments on desks before them, sit in tiers at one side of the room. They look down upon a large inclined plotting table perhaps 25 feet across upon which is a map of England, the Channel, the lower reaches of the North Sea and the Continent. This detailed map is marked off in the usual grid squares with key numbers for each square.

During a mission, plotters standing by this table keep a continuous visual picture of the mission's progress by moving over the map small metal plaques, one for each squadron of bombers and fighters.

Back of the controllers is another map covered with talc which shows in grease pencil lines the course of the day's mission and the routes in and out. Every controller, including men on Air Sea Rescue, is thoroughly briefed on the mission well before it starts.

Below the controllers, and to one side, is a group of enlisted men at telephones whose job consists of maintaining constant liaison with the RAF area headquarters and Coastal Command groups, advising them of all movements of American aircraft. Incidentally, this control center records and watches the movements of every airplane in the U. K.—down to little C-78s on station-to-station hops.

On the wall facing the controllers are boards listing the squadrons participating in the mission and their call signs. There is also a phonetic board to aid in telephonic communication, a color clock, a statement of weather at various stations so controllers can vector planes judiciously, and anti-aircraft warnings—descriptions of areas in England over which friendly aircraft are not to pass.

MAYDAY!

Capt. Fred William Graf, 8th Air Force, Air-Sea Rescue Controller.

BY MAJ. CHARLES D. FRASER

AIR FORCE Overseas Staff

Air Sea Rescue men in their special booth make good use of all this information, but the particular governor of their operations lies in another part of the building—the Triangulation Room, where fixes on aircraft are obtained by VHF/DF.

Along the eastern coast of England, in tiny huts on lonely marshy points of land or in the middle of wheat fields, are many forward radio stations of the 8th Air Force. Operators of these stations are tuned in at all times on their VHF sets for messages from American airplanes.

Open telephone lines are maintained between each station and the Triangulation Room. When a forward station operator receives a pilot's message, he transmits by phone the bearing he has on the plane. Another bearing comes in from another station. As quickly as they are given to the Triangulation Room, men working over a circular map 10 feet in diameter plot the bearings by drawing a string from the station's position on the map along the line given them by the operator. Where three or more strings cross each other, there is the plane's position. Generally, fixes are obtained as fast as hands can move.

While information thus secured is probably the most important single element in AAF control of Air Sea Rescue work, this whole service is so much a matter of American and British interchange of data and facilities that a quick summary of all elements is essential.

When the Fighter Wing took over this Operations Room from the RAF in July, 1943, the British had already developed Air Sea Rescue to a fine art. The task of AAF controllers was to fit themselves into the existing system and suggest such changes as were demanded by daylight bombing operations.

Capt. Fred William Graf, a robust and rather fabulous individual known to most people as Willie, a man who in his party moods has a significant fondness for wrestling, was selected as the Air Sea Rescue controller. Graf and the British officers of the RAF and Royal Navy got along like two GIs in London on leave and the present efficiency of the AAF rescue system is due largely to the high degree of cooperation established.

VHF radio had been perfected by the British during the Battle of Britain. It was especially useful because of its short range. The Germans on the continent seldom could pick it up and were thus kept in the dark as to where Spits were being vectored.

American aircraft were equipped with VHF and ways were found to extend its range when this became advisable.

As now employed by AAF aircraft, there are four VHF channels. Taking a fighter plane radio as an example, the first channel is the operational frequency over which an individual group of planes is controlled, either by its own field or by the Operations Room. There is a frequency for every operational group.

The next channel is the emergency channel, the one over which Air Sea Rescue operates. No plane can come into this unless in real trouble. The frequency is the same for all aircraft and the channel must be kept clear.

Another channel is that used by fighters and bombers for communication between aircraft. Another channel is sometimes known as the "homing" but is more accurately called the wing fixer frequency and is common to all groups of a combat wing.

Bombers do not use the same letter designation for these channels as the fighters—but the principle is the same.

That is the VHF set-up and is the only type of control for which the AAF has its own stations and facilities.

Other elements, however, are possessed by the RAF. Among the most important is radar. A radar SOS sent by a plane can be the difference between success or failure of a rescue.

When VHF can provide three bearings on a plane, the position can be fixed within a fraction of a mile, sometimes within a few yards. But this is not always the case. Sometimes only two bearings are received, which gives only an approximate and unreliable fix. One bearing is simply a line and nearly valueless. In such instances, radar reports frequently give the additional check necessary for a good fix.

There are still other means by which planes can learn their own positions. These can't be described technically, but for understanding of Rescue it is enough to know that a bomber pilot in trouble, discovering his position by use of such equipment, will pass that information on himself in terms of latitude and longitude to the Air Sea controller trying to bring him home.

Now, then, what happens when something goes wrong and an AAF plane is afire, out of gas, or in other trouble above the Channel?

Captain Graf, or one of the other five ASR controllers, is busy at his desk. Long before the mission began, he was busy. The RAF has been told of the mission, of the courses to be pursued by our aircraft, of the times of arrival at certain points and so on. Bases of the Royal Navy have

been similarly advised. A great deal of activity has been started. RAF Warwicks (modified Wellingtons) and Hudsons carrying large wooden lifeboats which can be dropped by a triple-parachute device have been sent to patrol specified sea areas. The lifeboats have engines, sails, food, water, and other necessaries.

RMLs (rescue motor launches) of the Royal Navy and HSLs (high speed launches) of Coastal Command have been alerted and are taking positions along lines over which AAF bombers and fighters will travel. Some British aircraft and sea vessels have American radio equipment and can be directed from the glass booth in Operations Room.

Spotter aircraft are also on patrol. They include American P-47s assigned solely to Air Sea Rescue. They carry two-men dinghies, smoke bombs, rations, water and other equipment that can be dropped. The RAF has sent out Spitfires similarly equipped.

If and when a plane gets into serious trouble the pilot presses the button which puts him on the emergency VHF channel and signals for attention by the famous "Mayday" call, repeated three times. He then proceeds to give his own code call sign, his altitude and indicated airspeed, and his approximate loss of altitude. Then he goes "over" to the ASR controller.

Always, the Air Sea Rescue man's primary aim is to help the plane get back over land somewhere and for that reason he tries to find out at once the source of the pilot's trouble, so he may gauge the seriousness of the situation. While the pilot talks—from his opening Mayday call—bearings are being taken on him and when the ASR controller has that information he promptly gives the pilot a steer to the nearest launch. If the plane continues to fly, the pilot does not stay on the emergency channel, since other planes may want to use it; but every few minutes he is asked for a count so that fresh bearings may be taken.

Meanwhile, however, both aircraft and surface craft are being alerted for the possible ditching or bail-out. Spotter aircraft are vectored to the position. They will escort the plane and in event of ditching will stay with it, circling and talking on the emergency channel to give a first-class fix. Surface launches are prepared for a rendezvous, but great efforts are made to bring the plane to a launch rather than vice versa. If it is cold or rough, men don't live long in the Channel and every minute counts.

The ASR controller, though depending mostly on VHF fixes, is also receiving information from the RAF. Furthermore, he may get a message from the damaged plane's wing man or other planes in the vicinity. Returning bombers and fighters with extra fuel frequently ask if they can help in Air Sea Rescue and not long ago a bomber, cruising around, found a fighter pilot who had just bailed.

Equipped with this mass of information, the ASR controller directs the entire rescue. Every decision is his. He moves at will the spotter aircraft, lifeboat-carrying planes, launches, and even destroyers or other Navy vessels not on active combat duty.

His first objective is to nurse the plane home to England, especially in heavy weather. His second is to maneuver it as close as possible to launches and other craft.

When a plane simply cannot make it, the controller advises the pilot on his course of action. Fighter pilots are usually told to bail out. Bombers are advised to ditch, for 75% of the men who ditch are saved and it's the preferable procedure in ordinary circumstances. When recommending a ditch, the ASR man obtains the plane's altitude, DR position, indicated airspeed and the number of feet per minute it is losing. By this data, with corrections for wind and so on, he can figure almost exactly where the plane will hit the water.

Obviously, control is the secret of Air Sea Rescue. And the controller must have great knowledge and a flair for speed and decision. To get a plane back to the nearest land successfully, he must know every mile of the coastline, for a mile can be the difference. He must be a technical expert, understanding how serious certain troubles are and how they can be surmounted. He must talk the pilot's lingo.

Most important of all, he must be able to keep his voice reassuring while extracting from the pilot every last scrap of useful information. Men in trouble sometimes forget to give it.

"What are you indicating there, son?" the controller says casually. The resulting answer may help to establish that vital fix when and if the plane goes into the drink.

In the early days of AAF operations Air Sea Rescue found one of its gravest problems the ignorance of pilots and crews. They should have known what to do in emergencies but frequently did not.

When Captain Graf, who holds the Legion of Merit for his ASR work, first organized the unit, he recognized that this ignorance could cancel all rescue efforts. Consequently, he launched a vigorous training program, lecturing pilots and crewmen on the use of dinghies and other equipment, and on radio procedure. That program continues for all new men coming to the theater.

Graf also had to adapt Air Sea Rescue operations to the American turn of mind.

For example, the RAF, when dealing with its own crews, insists on strict adherence to formal R/T procedure. This doesn't suit Americans. They want to tell their troubles in an informal, not to say salty, manner of speaking. The VHF frequently bears conversations which are enough to ignite the radio.

Again, the AAF Rescue controller will give advice on ditching or other matters, which is contrary to RAF procedure. Naturally, if it is a bad day, with many planes in trouble, all trying to use the emergency frequency, such conversation is cut to a minimum. But otherwise green or rattled crews are given much information which they may have forgotten for the moment.

As it stands today, the Air Sea Rescue system of the 8th Air Force is a masterpiece of consolidated control which, while it still depends heavily on the RAF and Royal Navy, is a shrewd, efficient adaptation of British technique to AAF operations.

Examples of this efficiency are countless. Many men have been picked up in a day. Other men have been located and picked up in the jet blackness of a winter night. One crew was found after being afloat in a dinghy for eight days. ASR is at work as long as an American plane is in the air and searches for missing men continue for as long as two weeks. Spotting, by the way, is one of the toughest bits of work in air operations, because of the slight perspective obtainable even from as low as 200 feet.

Occasionally, an Air Sea Rescue controller's life is brightened by some humorous and harmless incident. Like the time a fighter pilot pushed the wrong button, got on a channel, and unknowingly gave a lusty rendition of Home On The Range. Luckily, nobody else wanted to use the channel at the moment. But unable, anyhow, to get the frustrated cowboy off the air, the controllers turned up the volume and provided the whole Operations Room with a concert. The guy was good too, they say.

But mainly, Air Sea Rescue work, whether it be from the controller's standpoint or that of the airmen and sailors who do the drudgery part, is just a persistent, taxing, difficult and sometimes heart-breaking job—a job not to be measured in military strategy but in the higher terms of saving human life. ☆

CROSS COUNTRY

News and Views around the World

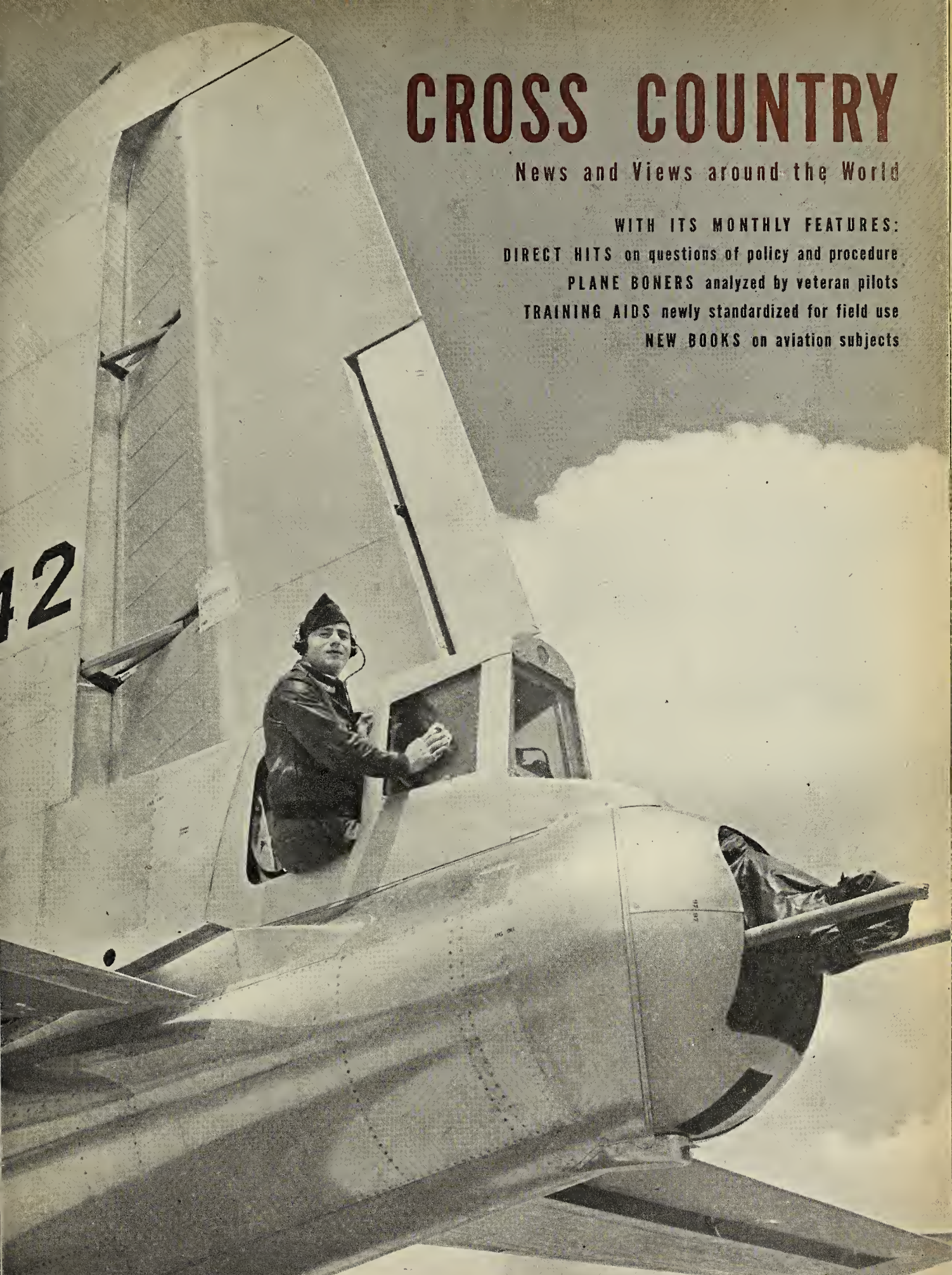
WITH ITS MONTHLY FEATURES:

DIRECT HITS on questions of policy and procedure

PLANE BONERS analyzed by veteran pilots

TRAINING AIDS newly standardized for field use

NEW BOOKS on aviation subjects



B-29 tail gunner applies pre-flight polish

General of the Army

AAF officers and men around the world and the air power they represent received a top-flight tribute on December 15 when General Arnold became one of four American Army leaders to attain the newly authorized rank of General of the Army. (See inside front cover.)

Similar promotions were received by General George C. Marshall, Chief of Staff of the U. S. Army; General Douglas MacArthur, Commanding General, U. S. Army Forces in the Far East, and General Dwight D. Eisenhower, Supreme Allied Commander in the European Theater of Operations.

Four equal ranks—Admirals of the Fleet—were approved for the U. S. Navy. Three of the four were filled by the promotion of Admiral William D. Leahy, the President's personal Chief of Staff and representative on both the Joint and Combined Chiefs of Staff; Admiral Ernest J. King, Commander in Chief of the Fleet and Chief of Naval Operations, and Admiral Chester W. Nimitz, Commander in Chief of the Pacific Fleet. The fourth Admiral of the Fleet was not named on December 15.

The AAF Commanding General, who was given four-star rank in March, 1943, serves with General Marshall, Admiral Leahy and Admiral King on the Joint and Combined Chiefs of Staff. The new Generals of the Army hold equal rank with British Field Marshals, while the Admirals of the Fleet correspond to the similar rank in the British Navy.

The designation General of the Army is distinct from that of General of the Armies of the United States, held by General John J. Pershing. It calls for no increase in base pay ($8,000) but raises the personal allowance from $2,200 to $5,000 a year.

The Congressional bill authorizing the new ranks did not specify the insignia which would be worn to indicate them, and action by the War and Navy Departments was still pending as this issue went to press.

Teamwork

American airmen flying over the once strongly-defended Jap airstrip on Pagan Island in the Marianas these days rarely encounter any anti-aircraft fire—and they can give a major share of their thanks to two P-38 pilots of the 7th Air Force—1st Lts. C. E. Williams and A. E. Wooten.

Some weeks ago, while Wooten flew over the airstrip as a decoy to attract the Japs' attention and ack-ack, Williams sneaked in low and fast and obtained photos which enabled P-47s later to blast the enemy gun emplacements practically out of the war.

Jap batteries sent up plenty of flak at Wooten but they failed to direct a single burst at Williams when he zipped in 50 feet over their heads and then scooted for home with 200 exposures in his camera.

"Waddy's Wagon," one of the most elaborately decorated B-29s in the 21st Bomber Command (see photo), had the momentary distinction of being the best looking Superfortress of them all in the eyes of the men on Saipan who sweated out the return of the 29s during their first attack on Tokyo. "Waddy's Wagon" was the first of the very heavies to come home after dropping everything but the kitchen sink on the Jap's No. 1 city.

Some Scrounging

Two 7th Air Force mechanics went souvenir hunting on the fringe of a newly won airbase in the Marianas and came back with a couple of Japs—live ones.

Unarmed, Sgts. William G. Pate and Roy F. Williams were beating around in the thick brush some distance from their base when a voice behind them sang out: "Thank you, thank you."

"I whirled around," Williams relates, "and saw a Jap marine about 10 feet away. Just then, the bushes parted and another

"Rita's Wagon" and the kitchen sink

"Waddy's Wagon" and everything but—

Wagons and Sinks

A couple of "wagons" with wings have been making life quite miserable for the Japs in the Pacific in recent weeks.

First, we have "Rita's Wagon," a veteran B-25 that heaped insult on injury by dropping, literally, the kitchen sink on an enemy installation during an attack in preparation for the Philippines offensive. Of course, "Rita's Wagon" had plenty of the more businesslike missiles to deliver but, for the crew members, the sink was the real piece de resistance. This hunk of domestic plumbing was found in a rusty, time-worn condition near one of our advance bases, and the boys saw to it that a paint job and suitable inscriptions were applied before the sink went into action.

appeared. We thought it was a trap so we ran full speed toward the base.

"After a few steps I stumbled and fell, and the next thing I knew the Japs were standing over me, but nothing happened. As I got to my feet, Pate came walking back. The two Japs raised their hands in surrender. Then one saluted and grinned as he repeated: 'Thank you, thank you.'

"I felt silly as hell."

PDC to Louisville

Headquarters offices of the AAF personnel Distribution Command will be moved within the next few months from Atlantic City, N. J., to Louisville, Ky. Purpose of the transfer is to centralize the command station among its subordinate units—three

redistribution stations and many convalescent hospitals and rest camps in various parts of the country. Date of the transfer is dependent on the completion of office construction in the Gibbs-Inman Building, Broadway and 9th Street in Louisville.

Night Fighters by Day

During the early days of the Leyte landings when circumstances were anything but ideal for the standard employment of night fighters, the P-61s based on the Tacloban strip were used for various odd jobs during the day and their pilots were targets of some good natured ribbing from the day-fighter boys.

"Why the heil don't you guys go home in the daytime?" a P-38 pilot joshed 1st Lt. A. W. Lockard as he was about to taxi his Black Widow down the strip to fly convoy for some PT boats at the southern tip of the island. "If you ever meet any Jap fighters they'll shoot your tails off for sure."

Lockard thumbed his nose and took off.

With most of the air action taking place over Ormoc Bay on the other side of the island that day, Lockard completed his job without encountering any opposition and was on his way home when he spotted a couple of Tonys.

"Fighters! Fighters!" Lockard shouted to the control tower. Having a lot of P-38s in the air at the time, control asked quite calmly, "P-38s?"

"No, no, fighters, man! Fighters! You know what I mean. Fighters!"

Control broke in, "You mean bogies?"

"That's it bogies, bogies. I couldn't think of the word but I'm going after those damned bogies!"

The Tonys turned back toward the coast but Lockard let go with his 20s. One of the enemy fighters crashed into a hill and a second later the other went down.

Those two victories as day fighters boosted the morale of the night fighter boys sky high.

Bug Control

A new mode of insect control has been adopted by 7th Air Force men based on recently captured islands of the Palau group. They have made tent pets of large green lizards which have a voracious appetite for bugs. First Sgt. Edward Kerns of Baltimore, who discovered the usefulness of the reptiles, estimates that each one eats thousands of insects a day.

B-29 Flight Engineers

Only commissioned pilots will be trained in the future as B-29 flight engineers, most of whom heretofore have been enlisted men. Headquarters officers explained that EMs now on duty as engineers on the Superfortresses have performed their assignments capably and will not be replaced, but that the overall importance of the flight engineer's duties and the desirability of having a third pilot available on B-29 missions had prompted the revision in the training program.

Enlisted men who are still in training to

DIRECT HITS

On Questions of Policy and Procedure

Q. When an EM is transferred from one organization to another, must new orders placing him on flight status be issued?
A. *No. Par. 6, Ch. 4, AR 35-1480, provides that an order issued by competent authority shall remain in force so long as that authority or a subsequent commanding officer of the EM concerned does not revoke it. This provision eliminates confusion and loss of pay, possible under previous regulations which called for an EM's automatic removal from flight status when he was transferred from the organization which originally authorized his participation in aerial flights.*

Q. Who are eligible for government-financed education under the GI Bill of Rights?
A. *Veterans who at date of enlistment or induction were under 25 years old or those who were over 25 but whose education in approved colleges, universities or trade schools was impeded or interrupted by their entry into service. Besides paying tuition up to $500 a year, the government will provide subsistence of $75 a month if the veteran has one or more dependents or $50 a month if he has none.*

Q. May a man awaiting shipment overseas at a port of embarkation be granted a furlough?
A. *In a case of emergency only (Par. 6, POR).*

Q. Is a man on furlough required to have WD AGO Form 31 and proof of extension in his personal possession at all times during his authorized absence from his station?
A. *No, but he may avoid unnecessary inconvenience by doing so. Although Army Regulations do not demand that furlough papers be carried at all times by the individual concerned, FM 19-5 directs Military Police to detain a man who fails to possess proper identification and adequate evidence of authority for his presence in a particular locality.*

Q. Is the wool field jacket (battle jacket) authorized for wear in the U. S.?
A. *Yes. The jacket may be worn, in lieu of the service coat (blouse), by all military personnel. Commanding officers in the U. S., however, will neither require the purchase nor the wearing of this jacket by personnel. The fact that the garment is not being issued in the U. S. at present should not be construed to mean that it is not authorized for officers and enlisted men (WD Cir. 391, 1944).*

Q. Must Service Record line-outs, which require no correcting entry, be dated and initialed?
A. *Yes. The Air Judge Advocate advises that under the provisions of Par. 1h, AR 345-125, every line-out in a Service Record must be dated and initialed.*

Q. What limitations are placed on the use of galvanized containers for food?

A. *The containers may not be used for cooking or for preparation or storage of fruit, meats, vegetable salads, lemonade, coffee, tea or fruit juices. They may be used for transportation and temporary storage of water and dry foods, and for washing and temporary storage of roots and tubers after peeling (Sec. III, WD Cir. 363, 1944).*

Q. May officers or enlisted men on leave or furlough utilize the facilities of Army reservation bureaus?
A. *Yes. Upon presentation of leave or furlough orders at an Army reservation bureau, or a branch office located in a railroad station, military personnel will be rendered every assistance possible in the procurement of sleeping car, parlor car, reserved seat or coach accommodations on trains (Sec. I, WD Cir. 396, 1944).*

Q. How is time computed for determining eligibility to wear overseas service bars?
A. *Time is computed between the dates of departure from and arrival at a port in the United States or the boundary of the continental U. S. Day of departure and day of return are included. The bar is authorized for each six months' period of overseas service since 7 December 1941. Service may be performed continuously or at intervals. All active duty or service outside the United States (permanent, temporary, detached, etc.) will be included. On 7 December 1944, six bars were the maximum number authorized for any individual (WD Cir. 268, 1944, as amended).*

PREPARED BY THE OFFICE OF THE AIR INSPECTOR

NEW BOOKS
On Aviation Subjects

AT WAR

AIR GUNNER. *Hutton, Bud,* and *Rooney, Andy.* A collection of stories from combat aircrews in the ETO. FARRAR AND RINEHART, N. Y.

BULLDOZERS COME FIRST, the Story of U. S. War Construction in Foreign Lands. *Bowman, Waldo G.,* and others. Operations of Aviation Engineers and Seabees in advance areas. MC GRAW-HILL, N. Y.

DAMNED TO GLORY. *Scott, Robert L., Jr.* Narrative tributes to the P-40 and its pilots by the author of *God Is My Co-Pilot.* SCRIBNER'S, N. Y.

FIRST OF THE MANY. *McCrary, John R.,* and *Scherman, David E.* The 8th Air Force, its men and operations. Many pictures. SIMON & SCHUSTER, N. Y.

FLYING LEATHERNECKS. *Hubler, Richard G.,* and *De Chant, J. A.* Two and a half years of Marine Corps flying activities in the South Pacific. DOUBLEDAY DORAN, N. Y.

MEDITERRANEAN SWEEP. *Thruelsen, Richard,* and *Arnold, Elliott.* Air stories from El Alamein to Rome. DUELL, SLOAN AND PEARCE, N. Y.

PILOTS ALSO PRAY. *Harmon, Tom.* The former All-America football player tells of his experiences as a B-25 and P-38 pilot. CROWELL, N. Y.

HISTORY

THE STORY OF AIRCRAFT. *Fraser, Chelsea.* A new edition of a basic history of the airplane. CROWELL, N. Y.

TECHNICAL

AIRPORT ENGINEERING. *Sharp, H. Oakley, Shaw, G. Reed,* and *Dunlop, John A.* A complete survey of its subject, from site selection to surfacing. WILEY, N. Y.

AEROPLANE FLIGHT. *Browne, H. F.* Diagrammed explanation of basic aerodynamics. LONGMANS, GREEN, N. Y.

CLIMATOLOGY. *Haurwitz, Bernhard,* and *Austin, J. M.* Textbook on a field contiguous to aviation. MC GRAW-HILL, N. Y.

GLIDING AND SOARING. *Andrews, John P.* How a glider flies, and how to fly one. MC BRIDE, N. Y.

POST-WAR

COMING AIR AGE. *Cleveland, Reginald M.,* and *Neville, Leslie E.* Changes air improvements will make in post-war world. WHITTLESEY HOUSE, N. Y.

INTERNATIONAL AIR TRANSPORT. *Mance, Osborne.* Survey of past international air regulations and speculation on future ones. OXFORD, N. Y.

WINGED PEACE. *Bishop, Wm. A.* Noted Canadian airman applies lessons of war to a prescription for the peace. VIKING, N. Y.

These books are available to AAF personnel through the AAF Field Technical Library Service, which provides for technical libraries at all major installations. List compiled by the AAF headquarters library.

CROSS COUNTRY

become flight engineers will not be affected by the change. Upon completion of their courses, they will receive assignments as originally planned. Leaving school as privates, they will be eligible for promotion to the grade of corporal after a month's training at a combat crew replacement center and master sergeant after transfer to tactical units.

The Childress Flying Club

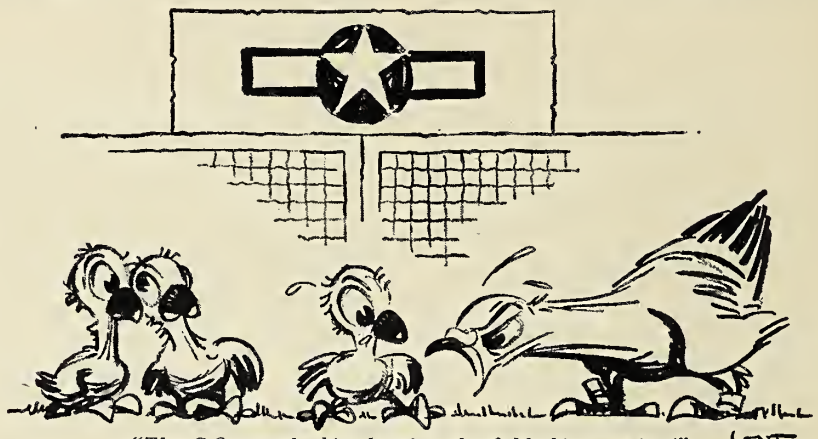
Some "ground-grippers" at the Childress (Texas) Army Air Field decided they were a little fed up with this tag and set about to learn to fly on their own time.

The result was the Childress AAF Flying Club with a membership of about 20 administrative officers and enlisted men who are amassing flying time in their own plane and picking up CAA pilot ratings.

When the club was organized in September, 1943, the charter members contributed $100 each to purchase a second-hand, 65-horsepower Taylorcraft. New members are required to match this figure as initiation dues, used at the rate of $5 a month for incidental expenses such as insurance, plane maintenance and hangar rent. Each member pays $3 an hour to fly the plane, and for members who have not soloed a CAA flying instructor is always on hand to teach them the ropes at the rate of an additional $3 an hour. It takes about eight hours of instruction for the average inexperienced member to solo.

The plane is kept at the Childress Municipal Airport, about six miles from the AAF base, and an orderly flying schedule for club members is maintained by the president, Capt. Robert Miller. Strict rules governing flight periods, cross-country hops and the like have been established to make the plane available on a fair basis to all members.

Aside from enjoying the off-duty diversion, most of the club members expect to purchase their own planes after the war, Captain Miller reports.



"The C.O. caught him buzzing the field this morning!"

Riding in Style

When an alert sounds at one 9th Air Force fighter base in Brittany, pilots and crewmen grab a train outside their tents and speed to their waiting planes. They have their own private railroad which they inherited, in mangled form, from the Germans who formerly used the airfield.

Much like the miniature railroads of American amusement parks, the narrow gauge line is only 1½ miles long, but it serves its purpose. The airmen call their one and only train the "Impromptu Express," because it runs on no particular schedule and all take turns acting as engineer, fireman and conductor.

After the base had been taken from the Nazis, armament and engineering men repaired the twisted trackage and the damaged tiny locomotive and cars. They relaid the tracks, running the main division from the plane line to personnel quarters and a spur to the ammunition dump after deciding the cars would be ideal for carrying bombs.

New Command Assignments

Recent changes in AAF command assignments:

Brig. Gen. Howard M. Turner, from commander, 40th Combat Wing, 1st Bombardment Division, 8th Air Force, to commanding general, 1st Bombardment Division, 8th Air Force.

Brig. Gen. Edward J. Timberlake, Jr., from commander, 2nd Combat Wing, 2nd Bombardment Division, 8th Air Force, to commander, 20th Combat Wing, 2nd Bombardment Division, 8th Air Force.

Brig. Gen. W. R. McReynolds, from chief, Training Division, Office of the Quartermaster General, to become Air Quartermaster.

Brig. Gen. Robert Kauch, from commanding general, Mediterranean Air Transport Service, to Chief, Air Installations Division, Office of the Assistant Chief of Air Staff, Materiel and Services.

Shield of Lorraine

An eager, hard-hitting outfit with one of the toughest flying and fighting jobs in the AAF is the way Maj. Charles D. Frazer, one of our staff correspondents in the ETO, describes Maj. Gen. Ralph Royce's 1st Tactical Air Force (Provisional), which is composed of both American and French units (see Page 28, December AIR FORCE).

"Before its organization was well begun, much less completed," writes Major Frazer, "planes wearing the American white star

and the French Tricolor were flying alongside each other, whistling their bombs into bridges, depots and gun emplacements, strafing troops, blowing tanks and railways out of action.

"The air force itself may be young but its men are veterans. One of the American groups, for example, the 324th Fighter, has been in combat since the days of the Desert Air Force, when it flew dusty P-40s. French airmen are all from the pre-war French Air Force. Most of them have been fighting off and on since 1939, some with the RAF, others with the AAF — in North Africa, Sicily, Italy, Sardinia, Corsica, and now in France.

"Air fighting in this part of France calls upon all a man's skill and experience. Nowhere in Europe are conditions any rougher than in the mountains of the Vosges or the plains of Lorraine. Take the forward American fighter group — a Thunderbolt outfit commanded by Lt. Col. Harvey L. Case, Jr. The base is situated on a plateau high among the Vosges ridges. The Germans built a grass runway on this plateau but used it only as a summer strip.

"In late November, the weather here simply could not be believed. Rain fell almost daily to flood towns and rivers of the region and to make the base such a sea of mud that steel taxi strips sank from sight into it, inches down. Mists steadily hung low on the surrounding peaks. A constant numbing chill made repair and maintenance difficult. Worst of all, no weather prediction could be trusted. Great changes could occur within a few minutes, changes usually for the worst.

"Organizationally, the 1st Tactical Air Force is set up on an extremely simple and flexible basis. It is divided into the 12th Tactical Air Command, which is American, and the 1st French Air Corps, which is completely French, including ground crews. This corps, incidentally, has feminine officers and enlisted personnel, corresponding to the American WAC, nicknamed 'Filles de l'Air.'

"The 12th has medium bombers, Thunderbolt and Mustang fighter groups, reconnaissance squadrons and night fighters. These units—like those of the French component—have been drawn mainly from the Mediterranean Allied Air Forces or the 9th

Pfc. O. A. Oxford

"That was better, O'Rourke. Now climb to 5,000 and let's run through it again."

PLANE BONERS

Analyzed by Veteran Pilots

COLUMBIA, S. C.—Four crew members of a B-25J were killed and two others were injured seriously when the plane, taking off at night, crashed into a 28-foot incline, located 2,300 feet from the end of the runway. There was no evidence of mechanical failure.

Comment: Night take-offs are similar to those made on instruments. Climb must be begun as quickly as airspeed and load permit. Faulty technique often results in loss of human life and valuable equipment.

ENGLAND—Returning from a non-operational flight, a P-47 pilot used up 1,000 yards of a 1,400-yard runway before his plane touched the ground and then had to apply his brakes so suddenly that the plane skidded and turned turtle. The pilot was injured and the P-47 was damaged badly.

Comment: Evidently this pilot, despite his many hours of experience, ignored the safety rule, "Pull up and go around again if you can't land on the first third of the runway."

MIDLAND, TEXAS—An AT-6 pilot, about to take off, was ordered by the tower to return to the ramp. Taxiing back, he piled into a parked L-3B, demolishing a wing of the liaison craft and damaging the propeller of his own plane. His excuse was that his attention was diverted by his radio conversation with the tower.

Comment: Radio communication is not supposed to interfere with a flyer's manual or visual operations. A pilot who is unable to spot a plane in his path while conversing on the ground certainly is an even greater hazard to himself and others in the air.

SYLVA, N. C.—A B-25J pilot and crew were forced to abandon their bomber after becoming hopelessly lost in instrument weather. All bailed out successfully.

Comment: The pilot, who was flying on a CFR clearance, violated practically every rule in the book. He failed to check the weather before the flight, to contact weather stations en route, to request an IFR clearance from Airways Traffic Control, to turn back when instrument weather was encountered and to ask his radio operator to obtain a bearing. If a pilot is to bring his crew and plane back safely, he must obey at least the basic rules of flying.

BRUNING, NEB.—Immediately after leaving the runway in a night take-off, a P-47 pilot felt a slight "mushing" in his plane—common to all fully-loaded Thunderbolts—and relaxed back pressure on the stick. The plane struck the ground. The pilot walked away from the crash but the P-47 was washed out.

Comment: The pilot could have determined from his airspeed indicator that he was in no danger of stalling.

MISSION, TEXAS—Two P-40s were damaged badly when the pilot of one of them, landing without flaps, crashed into the other on the runway. Although the offending flyer claimed he had used his flaps, inspection of the cockpit revealed that the flap control was in "up" position.

Comment: Clearly a case of improper landing check and careless approach.

LONG BEACH, CALIF.—Unable to attain sufficient airspeed after his throttles had slipped back, an A-20 pilot attempted to take off as he neared the runway's end, but the plane staggered up, stalled and then crashed.

Comment: Investigation revealed that the pilot was negligent on two counts. He had not adjusted his throttle friction brakes nor made any attempt to determine the cause when the lack of power became apparent. Either action probably would have averted the accident.

ST. JOSEPH, MO.—Preparing to land, a C-47 pilot-instructor switched the landing-gear lever to "down" position and then immediately placed the latch in positive lock position. He landed with wheels partly retracted, thus causing extensive damage to propellers, engines and other parts of the transport.

Comment: The prematurely-locked pins prevented the gear from dropping to landing position. The instructor was fined under the 104th Article of War and reduced to copilot status for failure to use his check list.

CHILDRESS, TEXAS—While taxiing on a ramp, an AT-11 pilot crashed into another plane, badly damaging both craft. He said he was giving his complete attention to his controls and did not see the other plane.

Comment: Blind flying should be limited to the air.

HARDING FIELD, LA.—Coming in for a landing, a pilot nosed up to avoid collision with an armament truck, parked partially on the runway. The truck driver contended that the pilot could have guided his plane around the truck.

Comment: A pilot should not be required to play tight squeeze games at high speed. Runways are constructed at great expense for use as flying strips and not as truck parking areas.

PREPARED BY THE OFFICE OF FLYING SAFETY.

Air Force. The 12th coordinates with the 7th U. S. Army.

"The 1st French Air Corps also flies medium bombers, as well as Spitfire and Thunderbolt fighters. This eorps eoordinates with General De Tassignys' French Army and one of its outfits, the Lafayette Squadron, is descended from the famed Lafayette Escadrille of 1914-18.

"General Royce and his staff comprise the Air Echelon functioning with Lieutenant General Devers' 6th Army Group. Development of 1st TAC has gone forward rapidly. Almost all French organization, even intelligence, is patterned along AAF lines, thus simplifying what otherwise would be a complicated management problem.

"While full recognition of the French Air Force undoubtedly will come one day, the aim of 1st TAC at the moment is to provide close coordination with very fast moving armies with the most flexible organization possible. And that's the kind of air force it is—a shifty, aggressive, eager bunch.

"Visit a 1st TAC base, either French or American, and you promptly get the feeling of men camping out, travelling light, ready and hoping to move on, flying every minute that is flyable, busily pushing their own bombing line back and back, out of France, into Germany."

Seeing Triple

Down the runway of the Mills Field Army Air Base near San Francisco, a C-47 takes off and between its two rows of litter patients moves Pfc. Aldinger, a 20-year-old blond medical technician.

Meanwhile, high in the air between Great Falls, Mont., and the 4th Ferrying Group base at Memphis, Tenn., another C-47 carrying wounded Pacific veterans has aboard a medical technician named Pfc. Aldinger. He, too, is blond and 20 years old.

Aldinger, Aldinger and Aldinger

Still another C-47 lands with a load of wounded at Mitchel Field, N. Y., and a Pfc. Aldinger, blond and 20, assists the flight nurse and hospital corpsmen in removing the patients to an ambulance.

Wherever C-47s of the ATC's Ferrying Division operate in the air evacuation service, one of the Aldinger triplets may be aboard. Never on the same plane, seldom meeting on the same field, the Aldinger brothers—Henry L., Robert J. and William F.—have each averaged more than 400 flying hours since they began their duty with air evacuation units last May.

The triplets entered the Army at Camp Upton, N. Y., in January, 1943, had their basic training at Fort Kearns, Utah, were given special training in surgical technique at Walter Reed General Hospital, Washington, D. C., and later were schooled in air evacuation work before assignment to the 4th Ferrying Group at Memphis.

'Gentle Annie'

To an overseas fighter station a few days ago came a letter postmarked Wilson, N. Y., and addressed in a childlike scrawl to: "Pilot of Gentle Annie, U. S. 8th Air Force, England."

Delivered promptly to Col. Harold J. Rau, who leads his Mustang group in the P-51, "Gentle Annie," the envelope eontained a newspaper clipping, a photograph of a little girl in pigtails and this message: Dear Pilot,

Gentle Annie and her pikchore

I saw the pikchore of Gentle Annie in the Buffalo Courier-Express. My Mummy and Daddy call me Gentle Annie to. I will pray that you don't get in as much trubol as I do. I am in the third grade.

Annie Croop

P. S. Here is my pikchore. I am 7.

Colonel Rau had named his plane originally for Ann Kenyon, of Providence, R. I., a Women's Airforce Service Pilot, but, he decided, "effective immediately, Gentle Annie is named also for little Annie Croop, of Wilson, N. Y."

Timely Award

On the day early in December that the War Department announced the award of the Medal of Honor to Maj. Richard I. Bong of Poplar, Wis., he was knocking off his 37th and 38th enemy planes over the Philippines. Then, less than two weeks later, he made it 39. The award was based on Major Bong's action in the Southwest Pacific area from October 10 to November 15. "Though assigned to duty as gunnery instructor and neither required nor expected to perform combat duty," the citation

*36, Bong! 38, then 39**

pointed out, "Major Bong voluntarily and at his own urgent request engaged in repeated combat missions, including unusually hazardous sorties over Balikpapan, Borneo and in the Leyte area of the Philippines." He shot down eight Jap planes during this period.

Parachutes

Lost:

Nos. 42-472445, 42-488232, 42-488652, 42-694125, 42-64689, 42,694099, 42-58025, 41-21298, 41-58007, 42-383065, 43-847412, 42-661236, 42-661237, 42-58033, 42-661243, 42-661243, 42-661248, 42-661232, 42-58027, 42-285484, all seat type; return to Technical Supply, Base Engineering, Hangar No. 1, Olmstead Field, Middletown, Pa.

Nos. 42-239727, 42-285076, seat type; return to Post Parachute Officer, Merced Army Air Field, Merced, Calif.

Nos. 42-683838, QAC type; 42-424625, 42-348998, 42-216794, 42-188897, 42-139972, 42-341598, all seat type; 41-2384, B-7 type; return to Personal Equipment Officer, Chanute Field, Ill.

No. 42-389533; return to Base Operations Officer, Midland Army Air Field, Midland, Texas.

No. 42-446127, seat type; return to Operations Officer, AAF Pilot School (Basic), Majors Field, Greenville, Texas.

No. 42-395195, 42-395204, both 24-foot seat type, return to Parachute Department, IAAF (Basic Pilot School), Independence, Kan.

Found:

No. 42-271182, held for storage charges in Union Depot baggage room, Dayton, Ohio. This parachute was checked in locker in March.

Nipped at the Wire

Many an AAF pilot has been called a "plane jockey." But recently one of them gained undisputed right to that cognomen by landing his A-25 Helldiver on the homestretch of the Beulah Park racetrack at Grove City, Ohio.

Like so many raceriders, this plane jockey

* Major Bong is shown on Leyte strip with Lt. Gen. George C. Kenney (right) and Col. David W. Hutchison.

was doing OK until he hit the wire. And hit the wire he did—literally. Thundering down the stretch, he ran smack into the cable strung over the finish line as a guide for judges and camera in close decisions. As might be expected, the Helldiver wound up second best in the collision.

The uninjured pilot said he'd become lost and figured he'd better land on the then deserted racecourse because he had only 65 gallons of fuel in his tanks. But one observer, pointing to the fact that seven suitable landing fields were within a 12-mile radius of Grove City, wondered if the Helldiver pilot hadn't been dreaming he was aboard Devil Diver, the thoroughbred handicap champion, when he picked Beulah Park.

Claws for the Cubs

The AAF's once harmless liaison planes are now spitting fire. Many of them in use as artillery spotters in France have been armed with 2.36 bazookas. A Piper Cub recently attacked two German trucks speeding down a highway, setting one of the vehicles ablaze and forcing the occupants of the other to flee into a wooded area.

Stripped of sights, grips, brackets and flash deflectors, the bazookas were adopted because a machine gun is too heavy for the light craft. One of the tubes, operated from the cockpit by electric triggers, is mounted under each wing of a plane.

Although it was feared at first that the bazooka blast might burn the plane's fabric, ground tests proved the venture was safe. Pilots became proficient marksmen through using obsolete tanks as practice targets.

Accident Prevention

Noting that any primary student involved in a landing accident often figured in another a few days later, the Western Flying Training Command has adopted a new method to prevent such recurrences. Now, after a crackup, a student is required to take a dual period with at least six landings and a supervised solo period with a minimum of three landings. Previously, an offender was given a dual period but in many cases he made only one landing before being permitted to solo again.

War Information Centers

Talks by combat returnees, supplemented by movies, still photos and maps, are the most popular presentation of the War Information Centers which have been set up at every domestic AAF base by the Special Services Division for the purpose of keeping GIs up to date on what is happening abroad.

Most of the centers have facilities for

PICTURE CREDITS

First Cover—Pages 6-7-8: T/Sgt. Roger Coster, Air Force Staff Photographer. 4-5: Capt. Raymond Creekmore, Air Force Staff. 9-10-11: Capt. Manford Susman, Air Force Staff. 18: British Information Service. 42: Fairchild Aircraft.

All other photographs in this issue furnished through official Army Air Forces sources. Requests for prints of photographs appearing in Air Force should be directed to the AAF Photographic Library, Headquarters, AAF, Washington 25, D. C.

TRAINING AIDS

Newly Standardized for Field Use

FILMS

Flak (TF 1-3389)—Treats of three types of enemy antiaircraft fire, the technique employed in their projection and the evasive action recommended for each type. Running time: 17 minutes.

Air Pom, Preparations for Overseas Movement (TF 1-3443)—An account of staging area processing of bomber crews. Running time: 16 minutes.

The Aircraft Magneto, Theory and Operation of the Four-Pole Magneto (TF 1-3638)—Demonstrates the principle of electromagnetic induction, the operation of the rotary four-pole magnet and the relationship of the magneto to the airplane's electric system. Running time: 30 minutes.

Out of Bed, Into Action (TF 1-3708)—Contrasts old and new methods of treating ill and wounded, showing methods by which patients are rehabilitated physically and mentally under the AAF Convalescent Training Program. Running time: 15 minutes.

Aircraft Recognition Tests Nos. 5, 7, 9 and 10 (TFs 1-3712 thru 1-3715) Used in advanced training, each of these movies offers about 30 brief views of approximately 20 different types of planes in flight in various theaters. Blank film between shots provides interval for students to jot down identification. Method of distribution is explained in Recognition of Instructor's Information Letter No. 6. Running time: From 10 to 20 minutes for each film.

Fifty-Hour Inspection of the P-51C (FSs 1-1004 thru 1-1009)—Series covers description of engine, propeller, landing gear, controls, instruments and fuel, oil, cooling, electric and hydraulic systems.

PUBLICATIONS

Field Weight and Balance Control for Aircraft (AF Manual No. 8)—Designed to save lives, planes and cargoes from loss due to incorrect loading, this loose-leaf booklet may be obtained by requisition to Commanding General, Fairfield Air Service Command, Att: Publications Branch, Patterson Field, Ohio.

Health and Disease in Hainan and Taiwan (ADTIC Regional Study No. 12)—With an eye to the future, this study—together with Study No. 13 which covers the Bonin and adjacent islands—briefs medical officers concerning insular outposts of the enemy. Copies may be secured from the Arctic, Desert and Tropic Branch, AAF Tactical Center, Orlando, Fla.

Maintenance of Electronic Equipment in Non-Temperate Areas (ADTIC Information Bulletin No. 17) Describes how radio maintenance men may prevent cold, heat, dampness or dryness from causing electronic failures. Copies may be obtained from the Arctic, Desert and Tropic Branch, AAF Tactical Center, Orlando, Fla.

Guide for Training Aids Officers (AF Manual No. 26)—Although not a new publication, this manual is recommended for newly-appointed training aids officers or for those who are not well-acquainted with the aims and procedures of the Training Aids Division.

Introducing Joe 'Flight' Gremlin (AF Manual No. 26)—Lists measures to prevent muscular tension, strain and fatigue before, during and after sustained combat flights. For additional details, see Page 28.

Weather Briefing Manual (AF Manual No. 38)—Intended to improve and standardize weather briefing techniques, it contains sample texts and forecasts.

GRAPHICS

The Aerial Gunner's Problem as Solved by Computing Sights (set of 13 posters)—Illustrates the basic principles of gunnery with Sperry sights.

New Graphics Catalog—Posters, charts and other graphic devices are described and, in many instances, pictured in this loose-leaf book, which also includes information concerning recommended use, availability and requisitioning procedure.

Information on the availability of training aids listed in this column, unless otherwise indicated, may be obtained from the chief, Training Aids Division, Army Air Forces, One Park Avenue, New York 16, N. Y., upon request through channels.

SNOW, SAND & SARONGS

• The search for gold brought airplanes to New Guinea long before the war. Lae and Salamaua, sites of bloody fighting for airstrips, were formerly used as take-off places for British prospectors who could fly to gold country at Wau in 30 minutes instead of laboring a month overland.

• A tribute to AAF air superiority in the Southwest Pacific is the word used by natives in some sections to describe an airplane—"merika." Once a Zero came over a field but, meat ball on the wings to the contrary, it was still a "merika" to the native neighbors.

• Tsutsugamushi fever is something you wouldn't wish on even a KP pusher. It is another name for mite-borne typhus, and its incidence increases, as the medics say, the closer we get to Japan. Aviation engineers, service groups and other units first into a new area are urged to take special care against chiggers or mites—to clear all brush around landing strips and campsites, and to wear clothing specially impregnated with insect repellent (dimethylphthalate).

• Aircrews flying the Hump are advised to take along a little bag of plain table salt as an item of emergency equipment. Many natives have difficulty getting salt in the mountains, and they will be especially friendly to any bailer-out who has a gift packet in his survival kit.

• Sudanese natives give Central African ATC officers the usual sanitation headaches which pop up when using native help anywhere. The only way to get mess workers to wash their hands after a trip to the latrine (which too often is merely "the great outdoors") is to post a monitor or guard and fine them a day's pay for every time they forget to wash.

• An old northern superstition and a dangerous one—is the notion that putting a frozen finger or foot into a liquid will help unfreeze it. Some liquids, such as kerosene, can go far below zero without solidifying.

• The Aleutians way up north? Dutch Harbor and Kiska are south of a great circle flight course from Seattle to Tokyo.

• A "sheltered" valley is about the coldest place to pitch a camp in the far north. The cold air sinks down, so the valley floor is likely to be several degrees colder than the slopes. The valley floor is most likely, however, to have timber and ice to melt for water. Moreover, that's where traplines and sled trails usually run. The northern slope of a valley will be warmest, because it catches the sun, which is to the south at midday.

PREPARED BY THE ARCTIC, DESERT AND TROPIC BRANCH, AAFTAC

screening combat films, including those captured from the enemy. At some bases, WIC branches have been established at post exchanges, service clubs and day rooms, where news bulletins and activities schedules are posted.

Muscular Tension

Since AAF combat planes lack the conveniences of a luxury liner, crew members often are required to sit, stand or lie in awkward and unnatural positions for several hours during a sustained flight. Muscles rebel at these abnormal demands, and aches, cramps and fatigue result unless preventative measures are taken.

These measures are outlined in AAF Manual No. 26, which General Arnold has ordered distributed to AAF flyers throughout the world. Through detailed illustrations, the booklet shows what muscles are most affected in each combat position, how those muscles may be strengthened by prescribed exercises before and after flight, how muscular tension may be relieved during flight and how a man may thoroughly relax his body so that he may gain the full benefit of sleep.

Titled "Introducing Joe (Flight) Gremlin," the manual was prepared by the Office of the Air Surgeon, in collaboration with the Physical Training Branch of the Office of the Assistant Chief of Air Staff Training, and published by the Training Aids Division, One Park Avenue, New York 16, N. Y.

Suggestion Program

The AAF Suggestion Program, which has proved highly productive of sound ideas and devices for improved efficiency in the Zone of the Interior, has been extended to theaters of operations. Military personnel can gain noncombat decorations, promotions or commendations and civilian employees can earn cash for proposals that result in savings in manpower, time, space, materiel or money.

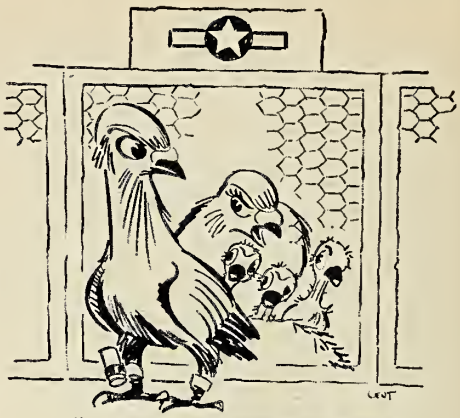
Since the program was launched 19 months ago more than 50,000 suggestions and inventions have been submitted and more than 5,000 have been adopted. Complete information on procedure for filing ideas is contained in AAF Reg. 37-3 and AAF Ltr 37-15.

Caterpillars and Sea Squatters

Airmen who have been forced by emergency circumstance to hit the silk long have had their own unofficial fraternity. It is, of course, the Caterpillar Club, once a somewhat exclusive "order" but more recently a wide-open lodge because of the war and such.

Comes now an organization for those whose fortunes have dictated that they be cast adrift in a life raft. Without too great an imaginative stretch, this association is called the Sea Squatters' Club, also an unofficial organization.

Just as several parachute manufacturers have perpetuated the Caterpillar Club to provide qualifying flyers some bond and attachment, a producer of life rafts has provided the impetus for the society of Sea-Squatters. Qualifying airmen may apply for membership and a club emblem to Sea Squatters' Club, 140 Cedar St., New York 6, N. Y. Incidentally, for Caterpillars who may not know the ropes, applications for club membership pocket credentials and insigne may be obtained by writing the Caterpillar Club, P. O. Box 1328, Trenton, N. J.



". . . and stay away from those Canary Islands!"

Dough on the Side

Enlisted men at Amarillo (Texas) Army Air Field, who find themselves in a financial tailspin just before they're set to take a furlough—or who discover that deductions have reduced their $50 pay check to $15—are beating a path these days to the USO job office.

Supervised by Mrs. W. L. Morris, wife of an AAF officer, the office finds jobs for soldiers who want to pick up extra cash by working in their spare time, or while on a three-day pass. This practice is permitted by War Department regulations.

Since the project began, hundreds of AAF men have supplemented their GI income by driving trucks, mowing lawns and working on farms or in filling stations.

Van Nuys (Calif.) Army Air Field also has an employment office operated by AAF women volunteers. Mrs. Reed O. Hudson, chairman of the employment committee, has helped scores of enlisted men find paying jobs "on the side."

Red Airmen Cited

Seven Soviet flyers have been awarded our Distinguished Flying Cross for outstanding action against Nazi air and ground forces on the Eastern Front. Cited by the American Embassy Headquarters, U. S. Military Mission, Moscow, they are Lt. Col. Vasili Stepanovich Moskovkin, Maj. Vasili Dmitrifvich Zhikharev, Capt. Georgii Mikhailovich Parshin, Capt. Arseni Vasilevich Vorozheikin, Lt. Viktor Markovich Dudnichenko, Lt. Peth Afanasevich Repkin and Lt. Sergei Pavlovich Shpunkov.

Stable Inspection

A primary function of veterinarians at overseas bases is to prevent the transmission of animal-borne diseases to military personnel, but now the vets are spending a lot of

their time checking on airborne animal mascots which aircrew members insist on bringing with them.

Lt. Col. Benjamin D. Blood, chief veterinarian of the U. S. Strategic Air Forces, reports "in a two-month period, pilots of the 8th Air Force flew in 30 dogs, six monkeys, two parrots and one honeybear. One crew coming back on a shuttle run from North Africa brought in a donkey."

In order to enforce Great Britain's strict quarantine laws, veterinarians have to inspect every incoming American plane. There are no official regulations against pets, but the mascots must be vaccinated for rabies.

Priority for OCS

GIs returned from overseas are getting the preference in the limited appointments still made to AAF Officer Candidate Schools. A poorly qualified overseas veteran doesn't rate ahead of an outstanding candidate who has seen only domestic duty, but when other factors are equal, the returnee holds the edge.

Postwar Reserve

The War Department has appointed two General Staff committees to prepare policies and regulations concerning the reserve component of the postwar Army. They are the Organized Reserve Committee and the General Committee, the latter dealing with both National Guard and Organized Reserve matters. Among the reserve officers appointed to serve on both committees is Col. Virgil C. Gordon, AAF, who previously held staff positions in Africa, Sicily and Italy.

In Memoriam

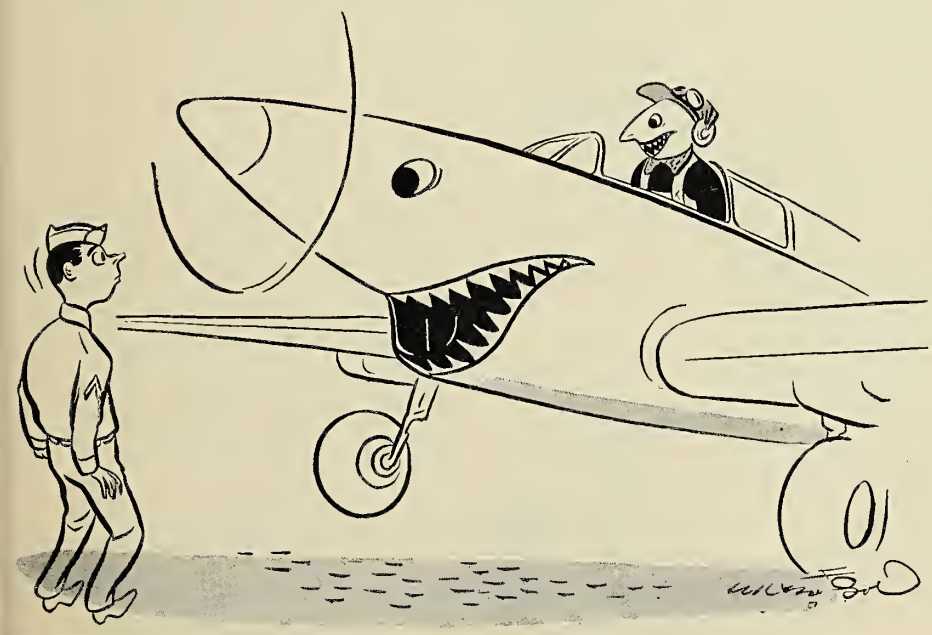
As a memorial to the killed and missing-in-action flyers of the 8th Air Force's 96th Bombardment Group, a 14th century chapel in the 12th century St. Andrew's Church, Norfolk, England, has been restored. The Bishop of Norwich presided at dedication ceremonies, assisted by the church's pastor and the group's chaplains.

The altar, cross, candelabra and hangings were replaced and a new stained glass window, appropriately designed, was installed. Based on a preliminary drawing by Sgt. Gerald Athey, Milwaukee, and executed by Reginald Ball, noted English craftsman, the window portrays Christ with an American airman looking up at Him, the church spire around which Army Air Forces bombers circle before heading on their missions for Nazi Europe and the insignia of the 8th Air Force, the 96th Bombardment Group and the group's squadrons.

Personnel of the 96th raised 597 pounds to restore the chapel, which originally was given the church by a Norfolk trade guild in honor of its patroness, St. Mary.

Short Bursts

Capt. Dick Grace, World War I pilot and later a famous movie stunt artist, is now a flying operations officer with the 8th Air Force. Rejecting a direct commission in January, 1943, he went through the mill as an aviation cadet. Prior to his present assignment, the 46-year-old veteran ferried planes to the CBI and ETO for the Air Transport Command. . . . U. S. prisoners of war in Germany call themselves "Kriegies," their own abbreviation for "Kriegsgefangener," the German word for war prisoner. . . . 1st Lt. J. F. Daniell, 8th Air Force Mustang pilot from Birmingham, Ala., shot down five planes in the Misburg-Hanover area November 26 on his first combat mission. . . . When a Jap bullet pierced the pressurized bulkhead of a B-29 during a recent combat mission in the CBI, one of the crewmen plugged the hole with a cheese sandwich. . . . License to manufacture the AT-6 advanced trainer has been granted the Brazilian government by North American Aviation, Inc. . . . Incidentally, AT-6s are replacing BT-13s at all basic pilot schools of the AAF Training Command. . . . Dr. Theodore von Karman, formerly director of the Guggenheim Laboratory at the California Institute of Technology, has been named director of the Scientific Advisory Group attached to General Arnold's office. The group's announced mission is to further long-range research and development and to pursue special studies concerning the relationship among scientific thought, technical research and airpower. . . . The ATC's Ferrying Division warns that pilots who have been checked out on late model planes should not be required to fly earlier "war weary" models until they make a careful check for differences in operational systems. . . . Numerous accidents, minor but costly, have occurred because P-38 pilots fail to lock hatches before take-off, the Office of Flying Safety reports. . . . Designation of the Special Services Division has been changed to the Personnel Services Division. The activity remains under the Assistant Chief of Air Staff, Personnel. . . . Headquarters has issued the reminder that all AAF publications apply both to WAC and male personnel, unless they contain a specific statement to the contrary. . . . Personnel severely frostbitten while engaged in combat are eligible to receive the Purple Heart, according to a recent clarification of AR 600-45. ☆



Fritz Wilkinson

HOW SHARP ARE YOU?

Questions about the photograph on Page 2

1. What type airplane is shown?
2. What is painted on the nose?
3. How many guns are visible?
4. How many men are there in the picture?
5. What is the man on the ladder doing?
6. What is his grade?
7. What is the man who is cleaning the cannon standing on?
8. What is the grade of the soldier in the foreground unloading the 75 mm shells?
9. The stencilling on the cartridge case says it contains 50-caliber cartridges. How many?
10. How many 75 mm shells are lying on the ground?

ANSWERS ON PAGE 58

Why Not Contribute?

Whether they are short bursts or blockbusters, your suggestions for Cross Country items will be welcomed. Address your articles, comments and criticisms to Cross Country, AIR FORCE Editorial Office, One Park Avenue, New York 16, N. Y.

The Intercom

As a medium for the exchange of ideas, AIR FORCE presents these answers to its Question of the Month. Replies are those of personnel recently returned from combat duty in the areas indicated.

QUESTION: What changes would you make if you were your own C.O.?

S/Sgt. Michael Grady, gunner, Italy: "I would make sure that pilots understood discipline. Too many of them try to lean over backwards and become too friendly. It seldom works out. When officers become too friendly, the boys tend to lose respect for them and they never can get any work done properly. Our pilot understood discipline. We called him 'sir' and showed him the proper respect when we were on the job. But he knew how to be one of the boys and still make us do our work. Don't get too GI. Be a right guy, but know what discipline is, too."

S/Sgt. William MacFarlane, radio operator, Southwest Pacific: "I would give more leaves to the ground crews. Those guys work harder than most men who fly, and I think they deserve even more consideration than anybody else. They do their job day in and day out, and we get all the consideration. That isn't right. I know that I speak for all the men I flew with when I say that the ground crews are the real backbone of the air forces, and they deserve the best of everything. I'm sure most aircrews would give up their leaves so the ground men could get a real break."

1st Lt. Hugo Lazzarini, pilot, England: "I would try to arrange it so that all promotions are made on the same basis in all groups. In some outfits, they let a first lieutenant fly lead for a while, made him a captain, and then moved another man up. Other groups did not follow that policy, and I think it should be a uniform proposition. When I was overseas, it was our group policy that a second lieutenant had to make 15 missions before he was promoted. Now as soon as you arrive, you automatically make 'first'. Promotions should be the same for everybody."

1st Lt. Arthur Griffo, pilot, England. "I wouldn't make any changes. Not after what the Army did for me. When I went overseas, my wife was pregnant. And everybody gave me every possible help so that I could complete my tour in a hurry and return for my baby's birth. I arrived in England in April, became operational in May, and finished my missions on September 2. They even arranged for me to fly home and I was back in the United States by September 23. The baby was born on October 6—a seven-pound girl. You can see why I wouldn't suggest any changes."

Pvt. Melvin Fullerton, Link trainer instructor, England: "I would change the method of awarding ratings. I think they should be given out only as a result of examinations. You should be promoted and ranked according to your job and you should have to take an examination to get your job. There are too many stripes and too much rank. If the examination system were used, a man would have even more incentive. Then, too, stripes would mean much more. There should be just one measure of judging a man—how much does he know and how well does he apply it."

T/Sgt. Percival Chadwick, gunner, Italy: "I would keep aircrews together. We train with one crew and we should be kept with them so far as possible. It's just like a baseball team—you learn how to work together. You know what everybody can do and what they can't do. When we get in with other men, we aren't sure what they might do. Even though they might be the best men in the air force, we haven't yet learned to depend on them and that's bad. When you stay with your own crew, you get that feeling that when you need a man most, he is going to produce."

Rendezvous

(Continued from Page 3)

Small Unposed Photo

Dear Editor:

In your April 1943 AIR FORCE a picture of my husband appeared with several other officers at a South Sea Island tea party. As a wife would do, I cut this picture and held it very dearly; it never left my person.

My husband arrived back in the States this past summer and on our way to the reassignment station in Miami, Fla., we stopped in Alabama to visit the mother of one of these officers (who is now missing in action). On seeing her son's picture she changed her expression so noticeably that I could not take it back, when I saw what a small unposed photo meant. It hurt me to part with it, but I had my loved one with me and hers seems so far away.

This letter is to ask for a copy of AIR FORCE for April, 1943, so I may again have my picture. Thanks.

Mrs. Mariola Allard, Brigham, Utah.

It's in the mail. —Ed.

Near Death of a Contributor

Dear Editor:

. . . A lieutenant colonel I know called me in the other day and showed me the AIR FORCE issue for November and turned to the page with the article by me (Portrait of a Guy Thinking About an Island—Ed.) and he said he was proud of me and I said I was certainly proud of myself and we stood there gazing in rapt admiration. Anyway, it did look nice, and thanks.

As you know, I have switched from the big birds to the fighters and it is several thousand times better. I got into trouble, though, the other day at 30,000 feet over Hamm. We were spread out in battle formation to protect the big friends which were out of sight ahead of us. The sky was blue and the clouds below were thick and serene. Then we came upon the big friends in large numbers and they were below us where they should have been and the radio became filled with comment on this situation.

Then another voice said, "Richbitch four, there's an airplane coming in on you at 6 o'clock."

(I am richbitch four.)

This voice was cool and untroubled.

I do not know how long I took to mull over this announcement, but I think it was not very long.

I break left. A lean dark twin-engine-single tail job with crosses on the wings slides under me, shooting in great wild red flashes. Somebody says something about a bandit on the radio in a modulated tone.

My only emotion is total surprise. How in hell did he miss me? How come I am not dead, shot full of 20 millimeters? This aircraft is a Willy Messerschmitt 410.

My element leader is in a gentle unconscious bank to the right. My flight leader is in a screaming dive after the 410. The 410 is in a screaming dive for the III Reich, which is straight down.

(Continued on Page 60)

Airlock in Italy

BY BRIG. GEN. LAURIS NORSTAD

Chief of Staff, 20th Air Force

(Former Director of Operations, MAAF)

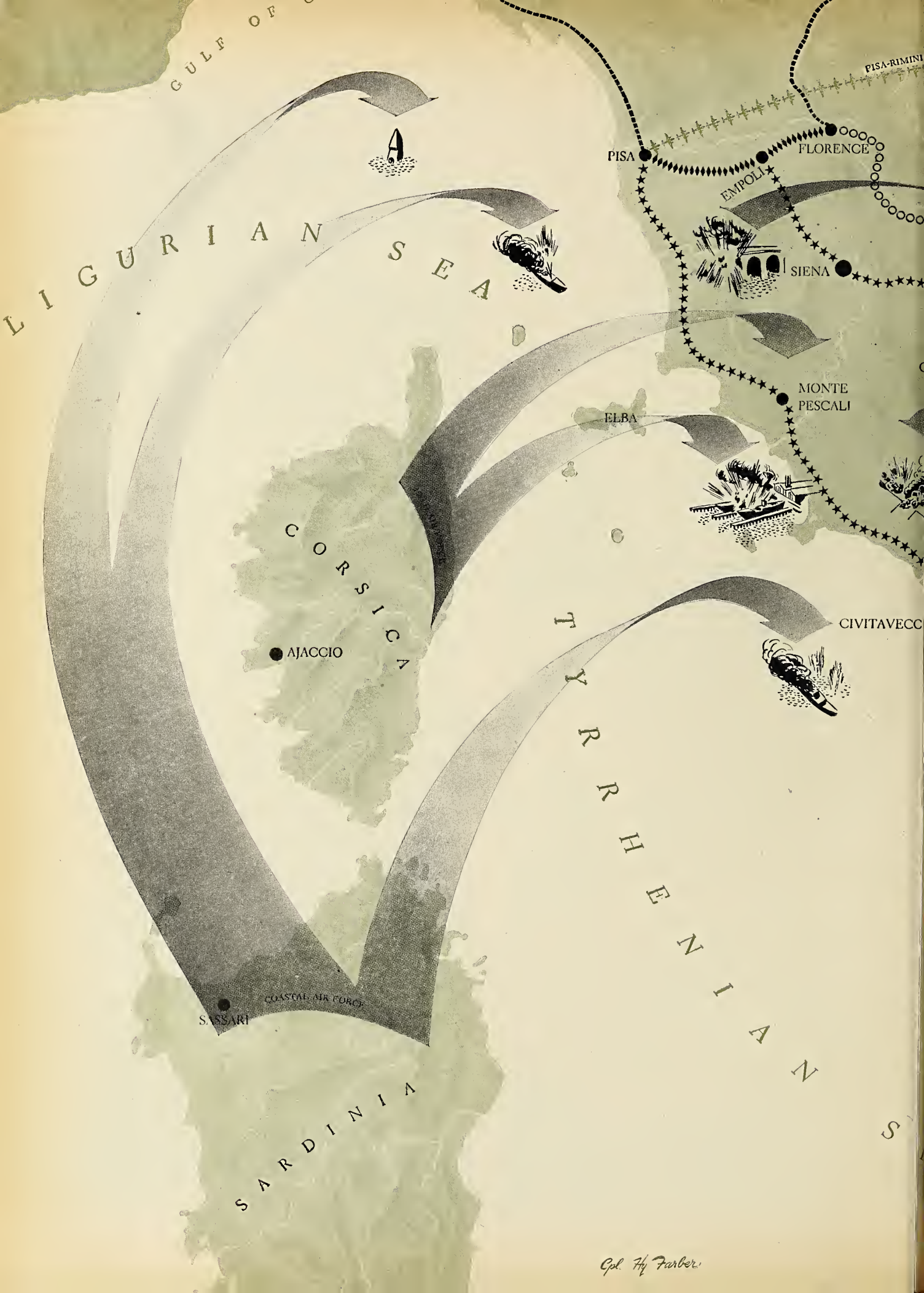
Most of this past year the Italian campaign has been generally overshadowed by developments surrounding the invasion of Western Europe. Too often it has been thought of as a secondary campaign, a sort of understudy to the lead. It may have been "secondary" only in the sense that the larger number of men and planes was quite naturally allocated to the assault from the West. But from every other standpoint the long, bitter battle for Italy has achieved not only complete dominance of Hitler's southern front, given the Allies control of the Mediterranean and airbases from which to pound the Reich's southern industrial targets, but tactically speaking has written the answers to many military question marks—answers which aided in the sensational conquest of France.

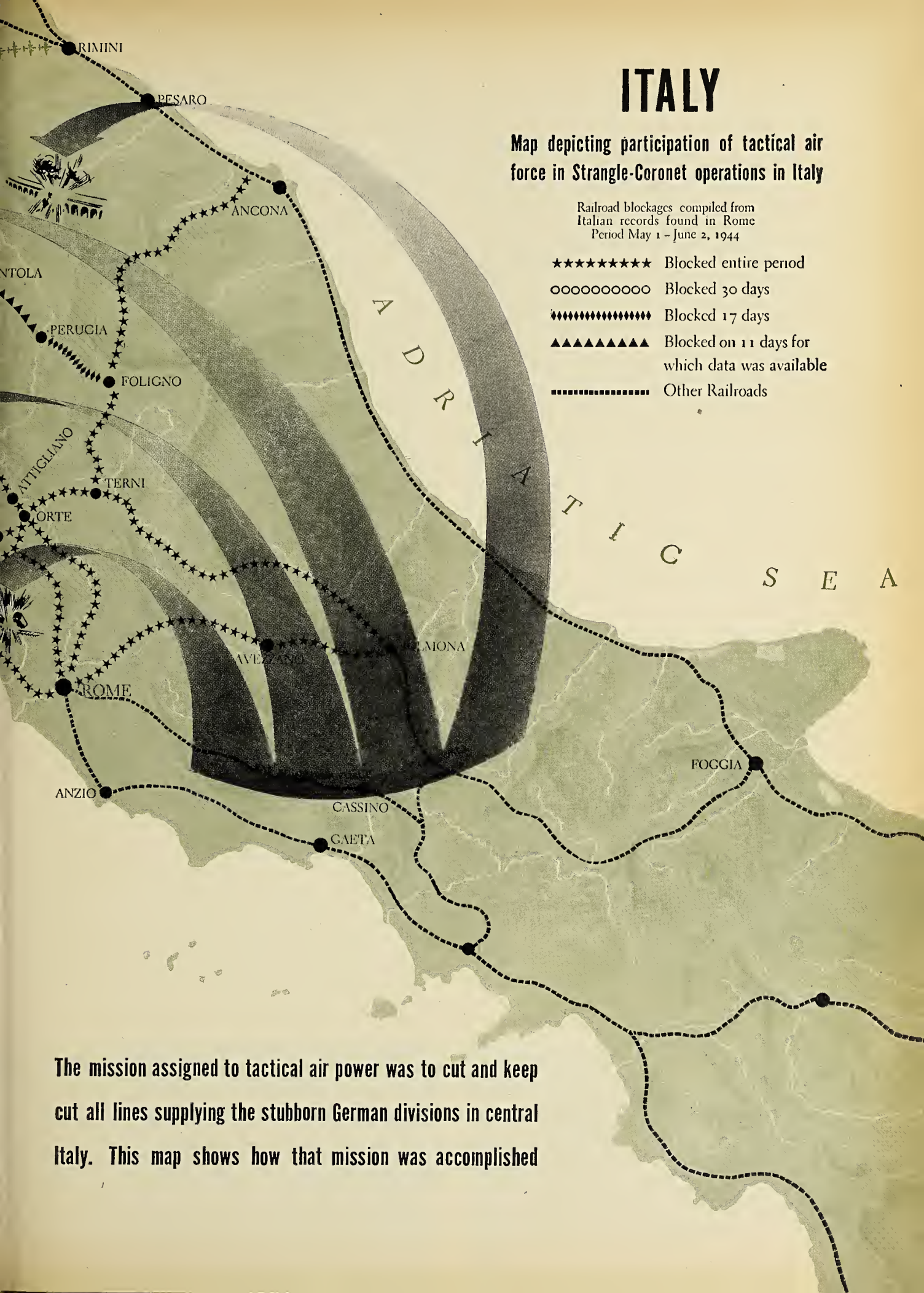
We've learned a lot since El Alamein about air strategy and tactics in a combined land-air offensive—in each succeeding step in the long march across Africa through Tunis, then to Pantelleria, Sicily, Salerno and Anzio, and finally to the battle for Rome and the retreat of the Germans northward. We learned what tactical air power could do—and what it couldn't do. More important, we had demonstrated what it *should* do.

That demonstration reached its peak in the great combined ground-and-air offensive that began on May 12 when Allied foot soldiers surged forward into action from Cassino to the sea and ended with the withdrawal of the Germans to the Pisa-Rimini line. Let us call this Operation CORONET, an unofficial name. The preceding aerial preparation from mid-March to the May 12 D-day was known as STRANGLE. Sufficient time has now elapsed since the conclusion of STRANGLE and CORONET to view them objectively from the standpoint of their contributions to the doctrine of air power.

When CORONET began in May, air and ground forces were given two complementary objectives. Mediterranean Allied Air Forces had as its mission "to make it impossible for the enemy to maintain his forces on his present line in Italy in the face of a combined Allied offensive." Ground forces were "to destroy the right wing of the German 10th Army; to drive what remains of it and the German 14th

Thunderbolts striking the far end of this causeway were followed by a Lightning photo plane which recorded this spectacular shot.


GULF OF
PISA-RIMINI
PISA
FLORENCE
EMPOLI
SIENA
MONTE
PESCALI
ELBA
LIGURIAN SEA
CORSICA
AJACCIO
CIVITAVECC
TYRRHENIAN
COASTAL AIR FORCE
SASSARI
SARDINIA
Cpl. Hy Farber.



ITALY

Map depicting participation of tactical air force in Strangle-Coronet operations in Italy

Railroad blockages compiled from Italian records found in Rome
Period May 1 – June 2, 1944

★★★★★★★★★ Blocked entire period

○○○○○○○○○ Blocked 30 days

♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦ Blocked 17 days

▲▲▲▲▲▲▲▲▲ Blocked on 11 days for which data was available

▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪ Other Railroads

The mission assigned to tactical air power was to cut and keep cut all lines supplying the stubborn German divisions in central Italy. This map shows how that mission was accomplished

Army north of Rome; and to pursue the enemy to the Pisa-Rimini line, inflicting the maximum losses on him in the process." In the next six weeks, working together in perfect harmony, the two forces did just that.

By any measurement this was a resounding military feat. It caused the Germans at least 80,000 casualties. It wiped out as effective fighting units a score of their most seasoned divisions. It destroyed and damaged fully 15,000 German transport vehicles and immeasurable mountains of military supplies. It was the first Allied offensive to capture an Axis capital. It was also, in General Alexander's words, the "first blow in the final destruction of the Nazis."

To have accomplished it, we had to have air superiority—and we did. Actually, therefore, the air participation in CORONET started long before D-day on May 12. It goes back not only to the early battles in the Tunisian and Sicilian skies which greatly weakened the Luftwaffe's striking power, but to the continuous blows directed against the sources of the enemy's aircraft by strategic air forces from both England and Italy. By the time CORONET began, the Luftwaffe was virtually eclipsed. Against the 20,000 combat sorties MAAF flew in the first week of the battle, the Germans were able to make only 700.

Granted, then, our air superiority. How we employed it is our chief concern here. Out of the Italian campaign comes this conclusion, established even more firmly than ever and later proved again in France: that in the absence of an effective enemy air force, the primary role of tactical air power is to operate against enemy supply lines in the rear rather than in the immediate battle area.

Back in the North African campaign, when General Montgomery and Air Marshal Coningham used their small air force to nip off Rommel's tenuous and over-extended supply lines, cutting roads, downing air transport, sinking ships and strafing motorized transport all the way from Alamein to Tunis, they provided the first proof of the wisdom of this doctrine. But North Africa did not provide a complete proving ground for the tactics of interdiction, since the supply lines to be hit were so few in number and relatively so vulnerable. The chief problem there was to find enough planes to do the bombing and at the same time furnish sufficient escort to protect the bombers from the still-powerful Axis fighter forces.

We were handed that test with Sicily and southern Italy. Not until then did the Allied air forces come to grips with a well-developed communications network neither simple nor vulnerable. And by then the Luftwaffe was tottering while Allied air strength was soaring, so on all counts there was every reason for regarding this period as a significant demonstration of what a tactical air force could do to enemy lines of supply.

Attacks on marshalling yards in Italy came first, as the major means of disrupting the enemy's flow of supplies. Although MAAF heavies ceaselessly pounded these yards all through the early fall of 1943, the long-range results were disappointing. We knocked out many marshalling yards, it is true, but it began to be apparent that while these yards were undoubtedly essential for handling the large volume of traffic required for the normal subsistence of Italy's civilian population, it was still possible for the enemy to move the relatively small amount of traffic needed for military supply (about 5 percent of the total) without using extensive marshalling yard facilities. This the enemy did, as a matter of fact, by making up divisional trains in the zone of the interior and moving them directly to a unit rail head located at any convenient point along a right of way in the vicinity of a highway.

Nonetheless, rail was still the biggest carrier and as such the most important objective in our interdiction plan. What we had to do, therefore, was to cut *all* rail lines, quickly and simultaneously, if we were going to keep the enemy from getting his vital 5 percent through. The decision to attack bridges, tunnels, and viaducts on a large scale was made in the face of opposition from experts who contended that bombing such targets was uneconomical. Also, these objectives required greater bombing accuracy than the same observers were willing to concede was possible.

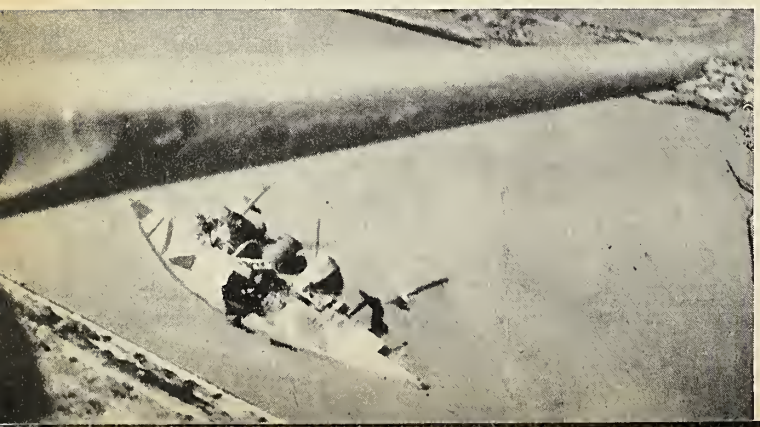
Subsequent results disproved both these arguments. The first attempt to establish a line of interdiction clear across Italy by cutting bridges rather than smashing marshalling yards was made in mid-October by 12th Bomber Command, then under Lt. Gen. J. H. Doolittle. In three weeks' time, they had cut the three major rail lines down Italy.

If we had really known how successful these operations actually were, Rome might have been a different story. According to an Italian general who reached the Allied side shortly after these attacks, the Germans actually considered abandoning Rome in consequence. Said the general: "Unaccountably the Allied raids on this important communication line ceased at the critical point and were switched elsewhere. By rapid and strenuous reconstruction work, which they were left in peace to do, the Germans restored the line. . ." Unfortunately this success was not perceived by the Allies, and bad weather and other commitments caused MAAF to abandon these interdictory attacks.

But plans went ahead in support of the AAF's belief in daylight precision bombing of "small" targets as well as the marshalling yards. In spite of opinions to the contrary, we were convinced "bridge-busting" would pay dividends with compound interest. When STRANGLE began, these "bridge-busting" policies had been adopted and a concerted program to knock out all German communications was on.

The Pisa-Rimini line marked the divisional assignments between strategic and tactical air forces. Tactical was to cut and *keep* cut all lines supplying the German front; strategic was to hit the marshalling yards in northern Italy beyond the reach of tactical. This worked very well—and this time the marshalling yards were worth hitting, for as the enemy's lines were cut farther down the peninsula by tactical, his supplies got hopelessly dammed up in the north, making lucrative targets for strategic. Coastal Air

Framed under the wing of a B-25 bomber, this Italian warship lies in Leghorn harbor, Italy, with a gaping hole ripped in her side.



An enemy ammunition train explodes in a white flash when hit by Mitchells of the 12th Air Force on line between Rome and Florence

Force, meanwhile, was to cut the sea-lanes. Gradually we began quite literally to strangle to death the Germans entrenched in central Italy. We cut their railroads and forced them to move their supplies by motor transport, a slow, costly business proving a heavy drain on rapidly diminishing fuel supplies. Then we bombed their roads and trucks and caused them to depend more on sea routes. So we bombed their shipping and their harbors. Eventually we had choked off all but a trickle of their supplies. What stocks were left were further reduced by bombing and strafing.

It is difficult to say exactly when STRANGLE began. Probably March 15—the date of the Cassino bombardment—is as good choice as any, for it was the failure to break through that German stronghold which finally permitted the release of the main fighter effort from the immediate battle area to attacks on supply lines. Once these aircraft were released, the accomplishments of Tactical Air Force (AAF 12th and British Desert Air Force), Maj. Gen. J. K. Cannon's command, in succeeding days exceeded even optimistic expectations, and by March 24, just nine days later, we had definitely cut all rail lines to Rome. And the "cuts" were kept up in such a manner that at no time after that date did any through traffic reach Rome.

Even so, it must be admitted that by the time CORONET'S great land-and-air assault was to begin, the objective of STRANGLE—that of using air attack to make it impossible for the Germans to operate in central Italy—had not been achieved. The enemy was *not* forced to withdraw all or even part of his forces due to strained supply problems. One of the things we learned is that, by carefully husbanding his stores, the enemy could hold out much longer than we thought. Supplies of ammunition, brought forward and distributed months before, had not been exhausted. Food shortages were made up at the expense of the local Italian population. And a good bit of material did move forward under cover of darkness by trucks and wagons and along the coasts by small craft.

There was no doubt, however, that although the enemy was not yet completely strangled, he was nevertheless gasping for breath. Many sources testified to the serious problems facing the German armies. They were short of gasoline and ammunition, and the appearance of prisoners, as well as their statements, evidenced serious food shortages. Units moving down from the north were forced to proceed by motor transport and by foot for hundreds of miles and were continuously attacked on the way. They frequently arrived in the battle area only after having suffered considerable casualties, losing large quantities of their motor transport and heavy equipment, and being dispersed to such an extent they could not enter battle as an integrated unit.

The enemy can hold out the way he did *only* if his situation remains static—if he's not being forced to put up a stiff fight.

So it was decided that the best way to meet the problem in Italy was to use the air to prevent reinforcements of the enemy's supplies and personnel, at the same time forcing him, by a large-scale, determined Allied ground attack, to use up at a very fast rate whatever he may have left. This was CORONET—an operation designed to make the enemy "burn both ends against the middle."

In retrospect, CORONET divides itself into three definite phases. The period from D-day to the 23rd of May may be properly called the Assault phase, that from May 24 to June 10 the Exploitation phase, and the period after June 10 the Sustained Offensive phase.

Except for immediate battle area operations, the Assault phase represented no departure from the tactics which had been in effect for two months, except in their intensity. Attacks were levelled not against any particular category of targets, such as bridges, but against sections of rail line. This included not only bridges, tunnels, viaducts, etc., but also open stretches of track. Aircraft assignments were normally these: medium bombers were to go after major bridges, marshalling yards and repair shops; fighters were to concentrate on active trains, tracks, major bridges under repair, and secondary bridges.

Here the fighters were able once more to prove their worth on long-range tactical assignments. On a number of days more than 100 track cuts were created by their effort alone, and throughout the entire period they averaged more than 30 cuts a day. When it came to bridges, in many cases they were more economical than the mediums. One of their greatest assets lay in their ability to operate in weather that would ground the mediums.

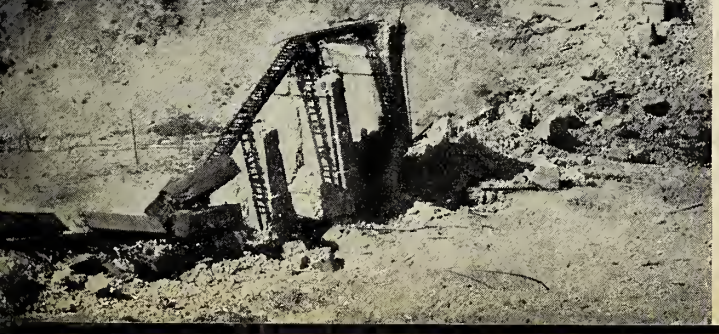
Since roads were so much more easily repaired than rail breaks it was difficult to keep them cut. Attacks were usually made as late in the day as possible with the object of creating traffic blocks at night and a difficult re-routing problem for convoys. This not only provided motor transport targets for night intruders but forced the Germans onto secondary roads where they couldn't make good time. Very often, as a result of this technique, motor convoys would be found in the open road at dawn—perfect targets for daylight raiders—whereas if they had been free to move on schedule they would have reached their dispersal area.

One German battalion, for example, was reduced to two-thirds of its original number of motor transport. They had 14½-ton trucks which had not been completed on the assembly line, but which had an improvised chassis made out of wood and cardboard. Most trucks in use were of Italian origin and here again they were in a spot because it was almost impossible to get spare parts as the plants which produced them at Turin and Milan had been destroyed by aerial attack.

As CORONET accelerated its attacks, the reports of motor transport destroyed began to mount. In April, 20 vehicles would have marked a day of good hunting, less than 500 being the total bag for that month. We began to pass the hundred mark with increasing frequency in May, reaching a total of 2,700 for the month. By night and by day bombers and strafers were taking their heavy toll.

(*Continued on Page 60*)

Here the bombers nailed a train and bridge with the same bombs. Such actions choked the Nazis back to the Pisa-Rimini defenses.



Flying low over rail yards this Marauder and others pinpointed their bombs and spared religious and cultural shrines in Florence.

Whether the Luftwaffe shows up or not, the air war over Europe can be very rough—and usually is

They Still Hav

"His voice was steady, as if by great effort . . ."

ILLUSTRATION BY T/SGT. DON BROCKELL

Crew 29 was in a high good humor that gray, cold English morning in late September. Before take-off, we gathered under the broad expanse of one wing of our Fortress, Lecherous Lou, and discussed the jubilant occasion.

"The thirty-third and last straight pass at the Herrenvolk! Detroit, I hear you calling!" S/Sgt. Tom Travis, ball gunner, combined a Lindy hop with an Apache war dance.

Our top turret gunner, T/Sgt. Bill Crabtree, in his slow Texas drawl, characteristically squelched him: "Stop knocking yourself out, Tom. We'll probably just about get off the ground and blow up at the end of the runway."

Travis heaved a Mae West at him. First Lt. Joe Ross and I grinned at each other. For six months, we had been listening to this sort of high-geared kidding, and, though no one indulged in any maudlin histrionics, we both felt a twinge or two of sentiment, realizing that this was the last time the gang would be together.

Both of us were qualified first pilots. We had been assigned to the same crew after arriving in England early in the spring of 1944. The ensuing months had been full of fun, excitement, hard work and grueling hours. On the whole, they had comprised a long and rocky road that sometimes, especially in the chilled dampness of two a.m. briefings, had seemed to stretch endlessly before us. It would be a downright untruth to say that we were sorry to reach the end of that road. It was a good deal like graduating from school; you were glad to be through, and, at the same time, you felt somewhat reluctant to leave it all behind you.

Despite the heavy bomb and gas load, Lecherous Lou took off easily, gracefully, like the eager old warhorse that she was, with none of the earth-hugging tendencies of other ships. The two hours following take-off had always been boring to me, climbing to altitude and assembling into formation over England. But today there was no boredom. We could have assembled for five hours, and I'd not have objected. This last flight was pure enjoyment.

We had a target that would be a pleasure to smash—a factory in Germany putting out Tiger Tanks and, bane of our lives, flak guns. First Lt. Bob O'Connell, our well-upholstered bombardier, was particularly gleeful at the prospect, for, ever since the day a hefty hunk of flak had ripped off his oxygen mask, failing to cave in his unshaven face by a scant single inch, he had sworn a solemn personal vendetta against all German flak gunners and flak guns.

The trip across the channel and the liberated area of Belgium was uneventful. We passed over Brussels, until just a few weeks ago one of the hottest flak areas in occupied territory. Ross and I alternated in flying the necessary close formation, wrestling through prop wash and cursing the day we'd been assigned to four-engine ships. It was an accepted routine, after a few hours of eye-back-and-arm-straining work, to moan and wail over the sad fate that had failed to place us in P-38s. The crew had become so accustomed to it they would have thought something wrong if we had omitted it.

Just before crossing into Germany, I called T/Sgt. Ed Leitelt over the interphone and asked him to pull the valves on the Tokyo tanks in order to let the gas drain into the main tanks. Ed, one of the best radio operators in the group and without a doubt the most popular, was in high spirits. Married for ten years and the father of a lovely four-year-old girl, Ed was planning a joyful and long-postponed reunion with his family. S/Sgt. Jaxon Booker, tail gunner and another Texan, interrupted us to report two ME-109s above and behind us. He kept tracking them, but before they came within range, two of our escort P-51s were hot on their tails. Booker described one Jerry going down in smoke while the other disappeared in a near-vertical dive.

lenty of Flak

BY FIRST LT. ALLAN H. GILLIS

8th Air Force

We had been briefed on the possibility of enemy fighter attacks and, of course, on the inevitable flak. We soon spotted the flak, but it was off to our right and slightly below us. The lazy, black, harmless-looking puffs had always fascinated me, giving me the same sort of scared thrill that a ride on a roller coaster had when I was a kid. Today I told myself we were invulnerable. After all, it was our last mission, and being shot down on our last was hardly cricket, was it? But I wasn't kidding myself. More than once, I'd seen a single burst of flak turn a powerful, throbbing four-engine plane into an enormous ball of orange flame.

For the next hour over Germany, we continued to dodge meager bursts of flak. We turned on course toward the target, and S/Sgt. Kenneth Jorgensen, waist gunner, called over the interphone:

"There's a ship in the group behind us in flames; it's spinning in!"

"Flak off our right wing," called Sergeant Crabtree.

The interphone became crowded with reports now. Two more planes behind us had been blown to bits. Both Sergeant Booker and Sergeant Jorgensen reported the flak was "climbing" up to our altitude. Ahead of us and uncomfortably close, flak was bursting at our level. The bursts were large, and I knew we were getting it from the 155s. Suddenly, the flak that had been ahead of us was on all sides. The whole ship shuddered and bounced as shrapnel tore into the wings, the fuselage and the engines. I saw smoke streaming out of number one engine and flames shooting out of number three. The oil pressure on the latter was dropping, and I had just chopped back on the throttle and hit the feathering button, when hell broke loose.

Two loud reports, like a couple of 45s being shot an inch from my ear, resounded throughout the plane. Simultaneously, the Fortress was thrown up vertically on her left wing. With all our combined strength, Ross and I struggled with the controls, narrowly avoiding crashing into the ship on our left. We were losing altitude fast, trying to escape the flak that was so persistently following us. Number two engine's oil pressure was almost gone and it had to be feathered. A loud hissing sounded in our ears; it was the oxygen escaping from several broken points, and we were still at 20,000 feet!

The interphone had been clear during the past three minutes, but the silence was broken abruptly by Ed Leitelt. His voice was steady, as if by great effort, but there were undertones of strained agony.

"Al—Joe, I've been hit in the leg—bad."

Sergeants Jorgensen and Travis both rushed from the waist to administer first aid. They found the radio room full of holes and blood. Though they didn't know it at the time, Ed's leg from his knee to his ankle had been shattered to a pulp by two hundred pieces of shrapnel. Without any previous practical experience, these two men controlled the natural panicky sense of horror they felt and efficiently applied a tourniquet, gave him morphine and administered oxygen from an emergency bottle. They did this while the flak was still hammering us. One piece of German metal tore through the radio room while Sergeant Travis was applying the tourniquet and creased the side of his head, stunning him and ripping off his helmet.

Meanwhile we had dived to 15,000 feet as quickly as we dared and were doing our best to maintain it, but this was impossible with only two engines and a full bomb load. Number one engine was still smoking badly, but much as we dreaded an oil fire, we didn't dare feather it—not while we were still over Germany. First Lt. Chuck Mundorff, our navigator, had given me an approximate heading to the nearest point in Belgium and was just about to make a correction, when a burst of flak tore through the nose, smashing Bob O'Connell's hand and entering his left leg. The nose compartment was splattered by blood. Chuck had to administer first aid to Bob, decipher the map through the blood and figure our course at the same time.

We opened the bomb bay doors and salvoed the bombs, letting the devil take care of the Huns they killed. With this lightening of the plane, we were able to maintain a safe airspeed with a lesser rate of descent. We were still over Germany, but with a strong tailwind favoring us, we knew we could make it into Belgium, if we could avoid further flak areas. All of us realized that a couple more well-placed shots would finish the job of tearing the plane apart.

The next 15 minutes we spent praying and cursing, praying for the sight of Belgium and cursing the Huns who made us lose precious altitude in evasive action to dodge their unexpected bursts of flak. We were at a lowly 7,000 feet, heading for Brussels, when we finally crossed the bomb line.

Brussels was our objective, mainly because we knew that there would be the best medical treatment available for Leitelt and O'Connell. However, number one engine, in addition to smoking, had begun to shoot forth flames, and it was obvious that we could never hope to make Brussels on the one remaining engine. Chuck Mundorff spotted an airfield about five miles directly ahead of us. It was only a short landing strip from which Spitfires were taking off. I could see that one end was blocked off by bomb craters, but it was here or nowhere; so we let down over the field, shooting red flares and calling the tower.

On the final approach, Chuck called over the interphone that this was the "same damn field we bombed about two months ago when the Germans held it!" Ross and I were both struck by the irony of having to sweat out crashing into our own bomb craters, and we laughed—in a rather high-pitched way. We set the wheels down on the very edge of the runway and brought Lou to a brake-burning, screaming halt about 15 feet from the nearest crater.

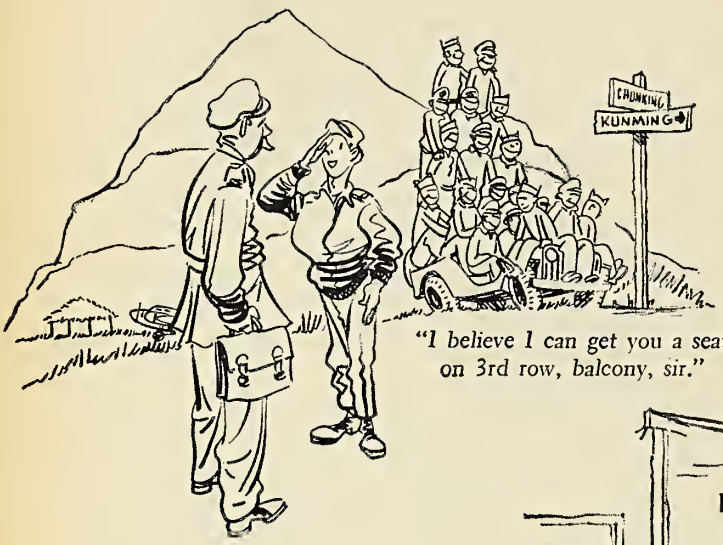
There was an ambulance waiting, and by the time we had cut the two engines, the medics were inside the ship getting out Ed. Bob came out under his own locomotion, protesting that he had nothing but a scratch. He almost collapsed under the strain of trying to convince us, and the medics bustled him into the ambulance.

We were all pretty glum during the interrogation. Ed had been unconscious for a half-hour before landing and no one knew just how close to death he might be. As soon as the formalities were over, we raced to the field hospital where he had been given emergency treatment. The medical officer assured us that though Ed's condition was serious, he would live. The wave of relief that ran through us was almost tangible.

Lecherous Lou was a sad-looking sight; she'd given her all that day. As we hauled our equipment out of her guts, we knew from now on she would be a ground-stomping spare-parts depot. It was sad, but she had brought us home from our toughest mission and our last. She had done her job, and we had done ours, and we left her there on the muddy airstrip, a gallant and tired old girl. ☆

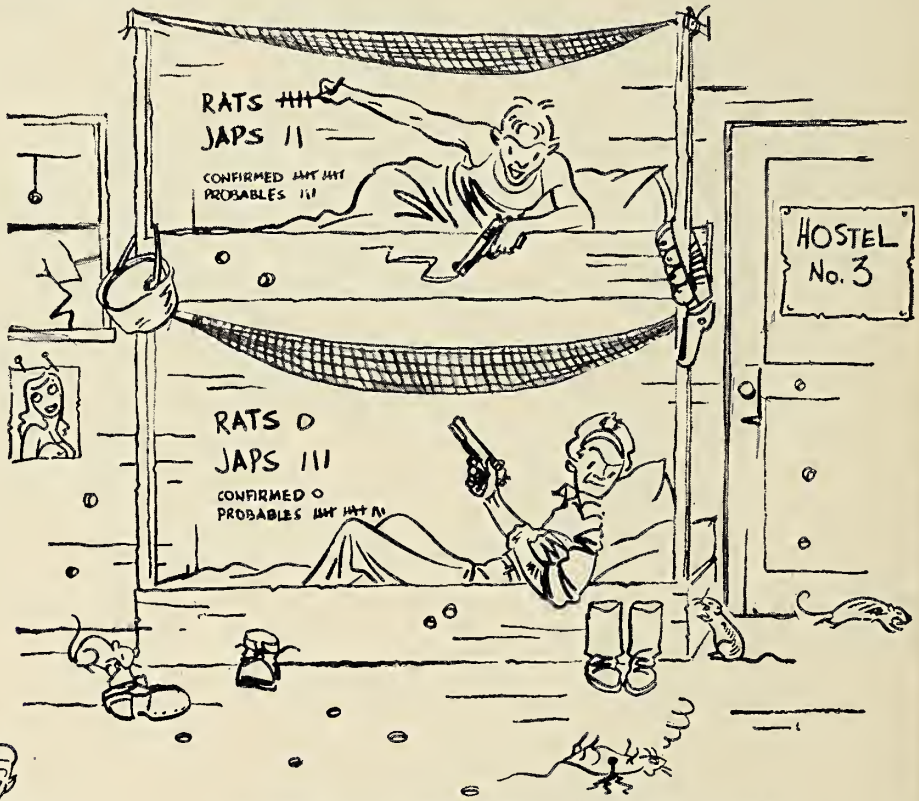
China Caricatures

by CAPT. WM. T. LENT



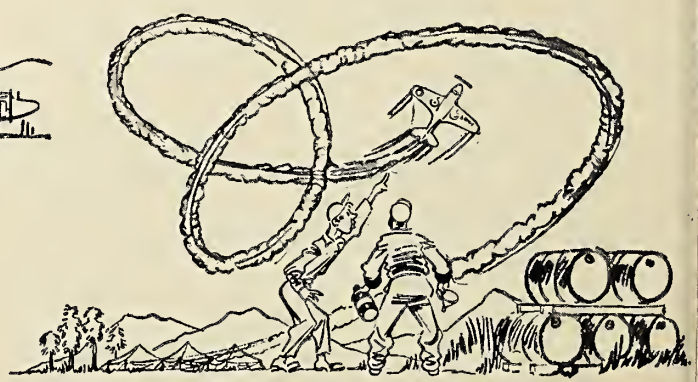
"I believe I can get you a seat on 3rd row, balcony, sir."

"But why not? We've used these P-40s for everything else."



"At the current rate of exchange, our scores are tied."

'I haven't got the 10,000 Chinese dollars, but I'll see you with a pack of Camels."



"No, he isn't jet-propelled. I just put a few drops of Chinese wine in his fuel tank."

PREPARE TO BAIL OUT!

By Maj. Luther Davis
AIR FORCE *Staff*

A staff sergeant who jumped from a flaming B-17 had this to say later: "I broke my hip and fractured my ankle. If I'd known what to do I'd have gotten off without even a bruise."

A gunner who bailed out in the ETO was asked what training he had had in the use of parachutes. He answered: "I'd heard two speeches which weren't worth a damn. Something about waiting for your falling body to slow down to 120 miles per hour before pulling the ripcord. Good Lord!"

The fact that the AAF today is in the midst of a very intensive campaign to educate us in the use of parachutes reflects this general ignorance, and is based on the work of a few pioneers in aerial safety like the late Lt. Col. Melbourne W. Boynton. Back in the summer of 1943, Colonel Boynton and his co-workers found, AAF men who resorted to parachutes suffered 16 times as many fractures as trained paratroopers.

Obviously, airmen in trouble have a very different problem than do paratroopers who step out the door of a transport flying at less than 120 miles per hour. Just the business of getting clear of damaged planes accounts for 75 percent of the AAF deaths, most of which are caused by not clearing the aircraft or jumping too low. Terrain differences account for some of the discrepancy between injury rates—but not all. The problem was to reduce our fatalities by educating flyers to bail out properly and in time; to cut down injuries by teaching them how to land.

Colonel Boynton, as head of the Medical Safety Division of the Office of Flying Safety, did the obvious thing—hied himself to Fort Benning. His idea was to see if a man who had no practical jump experience could learn enough on the ground—theory, in other words—to enable

There's a lot more to parachuting than just pulling a ripcord and then hoping everything will be OK. Everyone who flies should prepare in advance for the day he may have to bail out

him to land safely when he did have to bail out. After a day and a half of listening to Airborne Infantrymen's ideas on how to be healthy though falling, Colonel Boynton went to the Parachute Training Center of the U. S. Forest Service. There foresters are taught to descend into inaccessible mountain regions, and Colonel Boynton asked them to drop him—virtually untrained and completely unpracticed—over the kind of unpleasant terrain on which an airman might be forced to land. His first jump was onto bare rocks at Seeley Lake, Mont., and his second (the same day) into a patch of jagged timber. In the words of Colonel Boynton's report "both jumps were uneventful." He was convinced that the information he had gathered at Fort Benning had made possible his safe landings on rugged ground.

With that demonstration by Colonel Boynton, Flying Safety's current parachute program began in earnest. Colonel Boynton took the Fort Benning course, and he and his co-workers made water jumps, studied escapes from spinning planes, and made high altitude bail-outs, one of which eventually killed him. Flying through the air in these various experiments was a great deal of very conscientious brass—Colonel Boynton, Lt. Col. William M. Angus, also of the Office of Flying Safety, and Lt. Col. E. Verne Stewart of the Personal Equipment Laboratory at Wright Field were the guinea pigs on many hazardous jumps. Together, these officers and others worked out a basic technique for all phases of emergency bail-out—one that uses the experience of qualified jumpers but tempers it in recognition of the fact that most jumps in the AAF are complicated by panic, inexperience and confusion.

It's a technique that can be learned in advance and on the ground. In addition to cutting down landing injuries, it promises to reduce substantially the death rate. People who know how to jump, who realize that parachuting is not a fate worse than death, are less likely to ride their aircraft down too low before getting out. Too many flyers, simply through ignorance and fear, prefer to take their chances with a hopelessly damaged plane rather than hit the silk.

In this connection the Office of Flying Safety's file of questionnaires completed by AAF personnel who have made emergency jumps contains some interesting information. A large percentage of the new members of the Caterpillar Club make comments like this: "After I got out of the plane—which was a scary business—I actually enjoyed the jump. As I fell free, before pulling the ripcord, I was in full possession of my faculties."

To make a body turn to the right reach behind your head with your right hand and grasp the left risers. Reach across in front of your head with the left hand and grasp the other risers. Your hands are thus crossed, the right to the rear. Pull simultaneously with both hands. This will cross the risers above your head and turn your body to the right. You can control the amount of turn by varying the amount of pull. To turn to the left, reverse the procedure. Look down between your feet to establish the direction in which you are travelling, and always face the direction of your drift.

For some reason that sickening sensation in the pit of your stomach rarely occurs when you parachute. People who wince in a fast elevator often get no feeling of falling at all when they jump from an airplane. After leaving the plane you experience a sense of immense relief and you're surprised to find that you're capable of thinking, seeing, moving. It's an old wive's tale that you'll want to scream or that you fall faster and faster. In most cases you slow down as you descend into denser air. While terminal velocity in a free fall at 40,000 feet is 320 feet per second it is 160 feet per second at sea level. Also, your body tends to lose the forward speed imparted to it by the plane which probably was flying at considerably more than 100 miles per hour. Experienced jumpers refer to the "exhilaration" of the free fall; the "lovely quiet" after the noise of the engines. One officer, a navigator, who made his maiden jump over eastern China after the Doolittle raid on Japan remarked, "As I floated down through the black night, I was astonished to hear a little waterfall somewhere below me. I thought I'd be numb with fear but I wasn't. If I'd passed a bird on the way, I think I'd have fed it."

Undoubtedly it would be ideal if all who fly were permitted to make at least one practice jump under perfect conditions, but that would require a great expenditure of parachutes and parachute packing time. For the present, OFS is content with a program of education through posters, booklets, training films and with excellent courses in landing technique now being added by the Training Command to the curriculum for aerial gunners and aviation cadets. Comprising about 12 hours of student time, this course takes the place of many dreary hours of calisthenics, replacing them with tumbling and instruction on ground landing trainers.

These gadgets consist mainly of cables along which the cadets slide while suspended from parachute harnesses. Sometime during the ride an instructor pulls a rope which dumps the student—and he learns very practically how to absorb the shock of landing.

Part of this course and part of the educational program to which all of us are now being exposed concerns care of parachutes. Lots of men are dead today not because their chutes failed but because they didn't dare use them. Others have found that at the critical moment their parachutes were out of reach—men have had to sit at one end of planes with their chutes in the other, a wall of fire between.

Therefore, OFS sells these two related ideas: *Inspect your parachute frequently; see that it's properly fitted—and wear it whenever possible.*

Before taking off look at the date of the last inspection of your pack. The interval should not exceed 60 days in the United States or 30 days in the tropics. Open the flap, and make sure that the ripcord pins are not bent and that the seal isn't broken. See that the corners of the pack are neatly stowed so that no silk is visible. See that the six or eight opening elastics are tight. As for the fitting of the chute, remember that the harness should be comfortably snug when you're seated and disagreeably tight when you stand up.

In multiplace planes it's a good idea to have an extra pack aboard. In this connection, a story carried by the Associated Press illustrates the point. It concerns the crash of a 14th Air Force B-24 and goes on to say, "Major Carswell and Lieutenant O'Neal could have jumped as did the rest of the crew but they were sweating it out along with 2nd Lt. Walter W. Hillier whose parachute had been so riddled by flak that he could not use it. All three died."

If he has faith in his chute, and has it handy, a pilot will be mentally prepared to observe the next rule which is

For a normal landing, whether you've made a body turn or not, keep your hands above your head grasping the risers. Look at the ground at a 45° angle, not straight down. Set yourself by placing your feet together and slightly bending your knees. Don't be limp and don't be rigid. Ride on into the ground, drifting face forward. At the moment of impact, fall forward or sideways in a tumbling roll to take up the shock. And that's all there is to it.

if you find yourself in serious trouble, be ready to put your bail-out plan in operation. Know at what altitude you have to get out. If you're still in trouble when you reaeh that level—*bail out!*

Getting out of the plane, however, may be easier said than done. The best insuranee is to know in advanee where your emergency exits are. As for eseaping from spinning aircraft, the information—for obvious reasons—is seanty. Here's the account of the one survivor of a bomber that spun in: "The bombardier and I were in the nose. I tried to get up but almost blaeked-out. I guess the bombardier did blaek-out. He never got clear."

About all the advice that can be given on this situation is to try to keep your trunk and head parallel with the long axis of the fuselage to avoid blacking-out. Thus the centrifugal force is applied laterally to your body instead of driving the blood out of or into your head. Colonel Boynton conduеted a series of experiments in BT-13s which indieated to him that it was easier and wiser to get out on the inside of a spin—to the right when spinning right—

Tree landings are usually the easiest of all. If you see that you're going to come down in a tree, drop the risers, cross your arms in front of your head, and bury your face in the crook of an elbow. You can see under your folded forearm. Keep your feet and knees together. If you get hung up in a high tree, consider first the possibility of immediate rescue before you try to climb down. Failing that, get out of the harness and cut lines and risers to make a rope.

If there's a strong wind blowing when you land, do two things. First, make certain you carry out the procedures recommended for a normal landing. Second, roll over on your abdomen and haul in the suspension lines nearest the ground. Keep pulling until you grab silk. Then drag on canopy skirt to collapse it.

but he did not pretend that this was the final word for all types of planes or all kinds of spins. It follows that in this partieular variety of mess you're in double trouble if you don't know where your chute is or where the best and nearest exit is.

Assuming that you do get out all right, the next thing is to make sure that you're elear of the plane before pulling the ripeord.

Keep your eyes open and look around. You can see; you can tell when you're clear. The old method of waiting five seconds or eounting to three slowly is still good if you can remember to do it, but most people simply don't get around to counting. A sergeant who bailed out under exeeptionally difficult circumstances had this to say, "Right after leaving the plane things happened. I got in the slipstream or something. Then I relaxed and could see the ground and knew I was elear. None of us remembered to eount." Chanees are that most eases of fouling occur when men pull the ripeord as they jump, leaving no interval whatever.

OK, so you're out and you're elear. You're falling free and, to your amazement, you aren't minding it. If you bailed out from 15,000 feet or above you should continue the free fall until you get down to oxygen level—10,000 or below—whieh in most eases means not pulling the rip-

(Continued on Page 59)

ALMOST TOO SIMPLE

(Continued from Page 8)

against rotor rpm just as manifold pressure is balanced against engine rpm. All flight instruments run on pressure from the impeller rather than vacuum.

"The main thing for pilots to remember is to have the generator switch on," Kohler says. "The battery is very small and will not last more than ten minutes at the most. If the generator is not on, the fuel gauges read empty, the radio will not work and the electrical system on the instruments will go dead. About the only thing that can go wrong is for the pilot to forget to turn on the generator."

The importance of Kohler's advice was best portrayed by Brig. Gen. Frank O. Carroll, chief of the ATSC Engineering Division, when he took the plane up for his first jet-propelled flight. The general forgot to turn on the generator and the battery ran down.

Instruments went dead, fuel gauges showed empty and the landing gear would not come down. After making two cautious circuits of the field, the general came in for a belly landing, not too pleased.

When he got back to his desk his telephone rang and an engineering officer explained diplomatically that he would have his crew correct whatever the general had found wrong with the plane.

"Hell!" the general roared. "There's nothing wrong with that plane. It was the damned pilot that was wrong!"

In tech order language, the jet engines of the P59A work something like this:

At the front end of a large tube, air is drawn in from the atmosphere by a centrifugal fan, or compressor. It enters ducts leading to a series of burners where it is further compressed and heated, mixed with kerosene and ignited. Ignition again raises the temperature of the already compressed air and expands it, forcing it out of the burners through the blades of a turbine wheel and on out a nozzle, or jet, at the rear of the engine. This action is the powerful blast which drives the plane forward in a smooth, even flow. There is no series of explosions. The purpose of the turbine wheel near the back of the engine is to revolve the shaft, which turns the compressor and accessories, the only revolving parts of the engine.

The engine is turned over by an electric starter, but once this action is underway, the turbine which moves the compressor is driven by the generated blast. The engine and the forward speed of the plane are controlled by the amount of fuel injected into the burners, activated by a throttle in the cockpit.

The jet engine has about 10 percent as many moving parts as a reciprocating engine and, since there is only a rudimentary ignition system and no carburetor, there is no elaborate mixture control, nor prop control, nor icing worries.

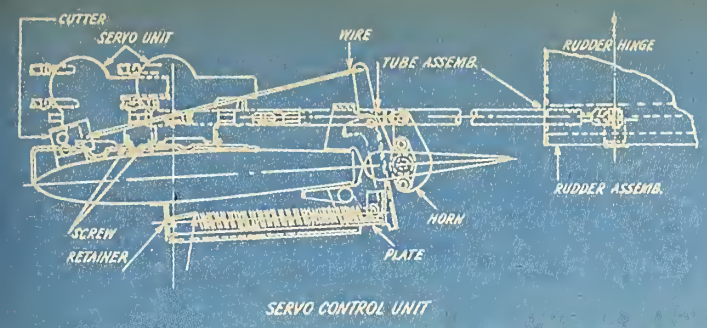
"You get all that in something they call a plumber's nightmare," Kohler says. "I take them apart and put them back, and I still can't find what makes them fly. It's the airplane of tomorrow—and it smells like an old oil stove." ☆

AAF QUIZ

WHAT'S YOUR AIR FORCE I.Q.?

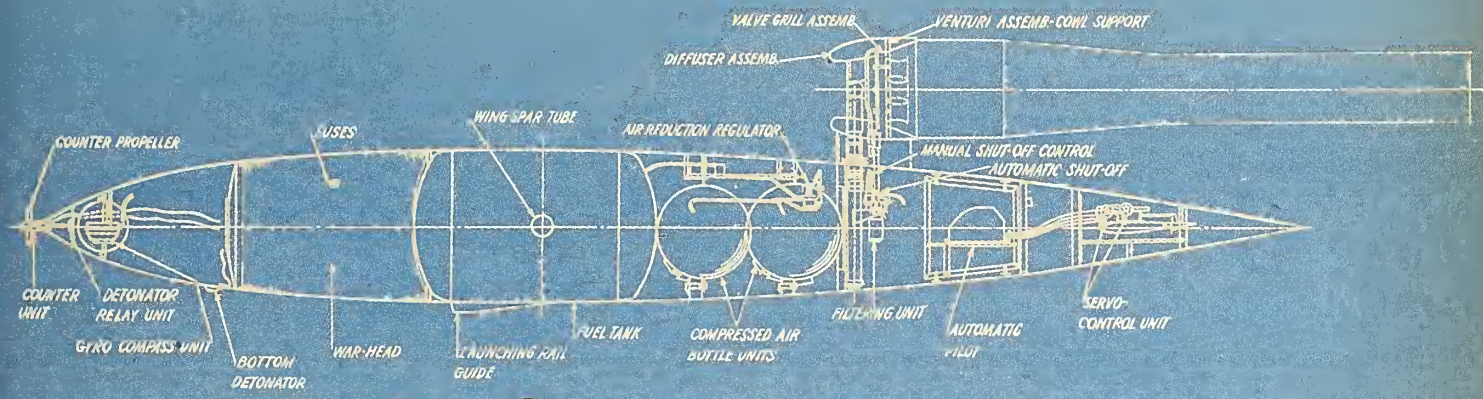
Here is your monthly brain-twister. Chalk up five points for each correct answer. A score of 90 or above is excellent; 75 to 85, good; 60 to 70, not too bad; below 60, tsk, tsk. Answers on Page 61.

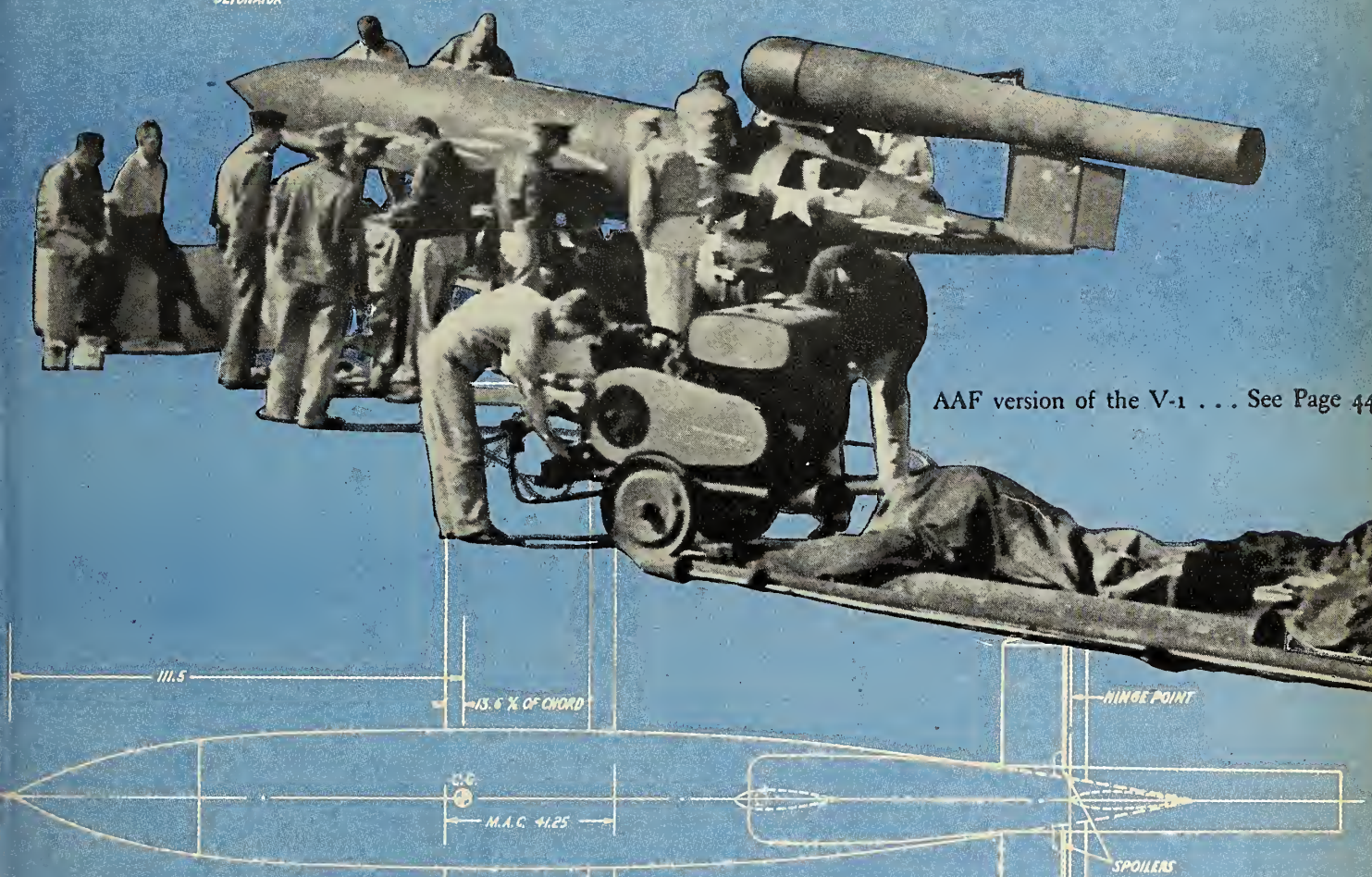
1. U. S. forces invaded the Philippines on
   A. *October 20, 1944*
   B. *September 22, 1944*
   C. *November 3, 1944*
   D. *October 9, 1944*
2. The C-97 is the cargo version of the
   A. *B-17* C. *B-24*
   B. *B-29* D. *DC-3*
3. The distance from Seattle to Tokyo in statute miles is approximately
   A. *12,000* C. *5,000*
   B. *2,000* D. *8,500*
4. The Commanding General of the Far East Air Forces is
   A. *Brig. Gen. Robert Douglass, Jr.*
   B. *Lt. Gen. Millard F. Harman*
   C. *Maj. Gen. St. Clair Street*
   D. *Lt. Gen. George C. Kenney*
5. Headquarters, 4th Air Force is located in
   A. *Seattle, Wash.*
   B. *Los Angeles, Calif.*
   C. *Portland, Ore.*
   D. *San Francisco, Calif.*
6. Each engine of the B-29 has a take-off rating of how many horsepower
   A. *2,200* C. *1,500*
   B. *1,800* D. *3,000*
7. The name popularly given the A-26 is the
   A. *Crusader* C. *King Cobra*
   B. *Havoc* D. *Invader*
8. Who is the PEO?
9. The letter Y before an AAF aircraft designation indicates that the plane is
   A. *In production*
   B. *Experimental*
   C. *A service test aircraft*
   D. *Obsolete*
10. The P-61 more nearly resembles the
    A. *P-39* B. *A-26* C. *P-38* D. *P-47*
11. The War Department gives the designation of "Ace" to a fighter pilot who has shot down five or more enemy airplanes.
    A. *True* B. *False*
12. In computing flying time, the time consumed in taxiing is not included.
    A. *True* B. *False*
13. No AAF flight engineers are officers.
    A. *True* B. *False*
14. A man falling free from 20,000 feet falls faster as he descends to lower altitudes.
    A. *True* B. *False*
15. In zone of interior establishments, a technical sergeant must serve in grade how many months before he may be advanced to master sergeant
    A. *Three* C. *Six*
    B. *Fifteen* D. *Twelve*
16. The first B-29s to raid Tokyo were based
    A. *In China*
    B. *On Leyte*
    C. *On Saipan*
    D. *In India*
17. The Bonin Islands are located between
    A. *Saipan and Japan*
    B. *The Philippines and Japan*
    C. *Guam and the Philippines*
    D. *Tinian and Saipan*
18. In order to obtain the rating of senior pilot, it is necessary to serve how many years as a rated pilot?
    A. *Five* C. *Ten*
    B. *Three* D. *Eight*
19. Bangkok is located in
    A. *India* C. *Burma*
    B. *China* D. *Thailand*
20. Identify this plane. ↓



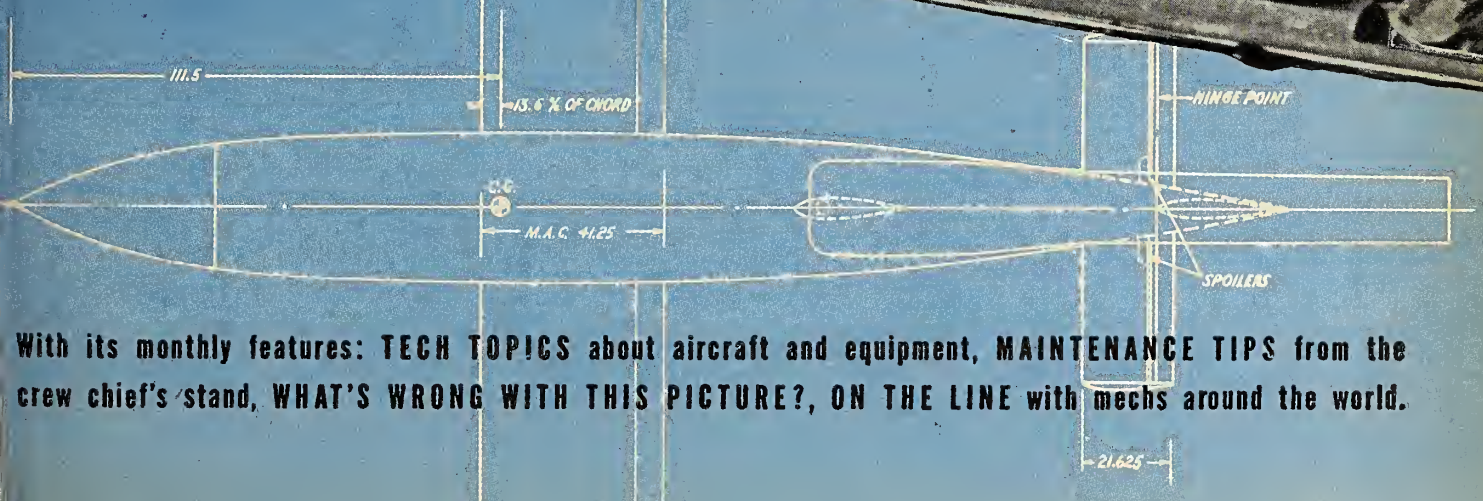
technique

Development, Maintenance and Supply of Aircraft and Equipment

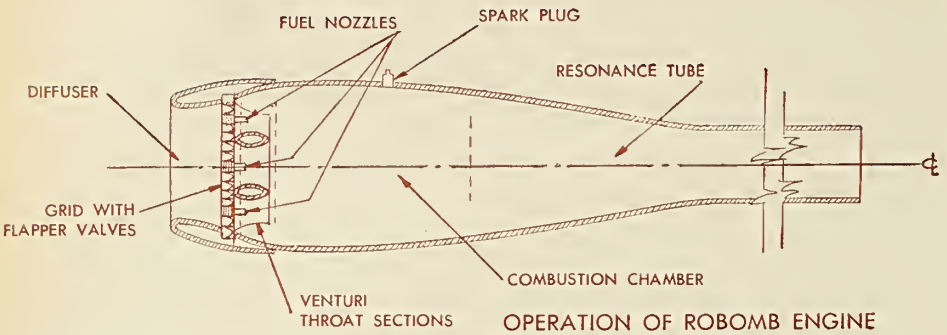




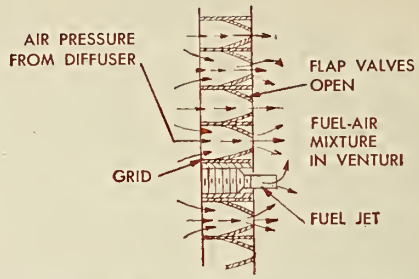
AAF version of the V-1 . . . See Page 44



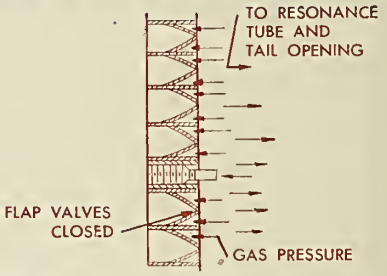
With its monthly features: TECH TOPICS about aircraft and equipment, MAINTENANCE TIPS from the crew chief's stand, WHAT'S WRONG WITH THIS PICTURE?, ON THE LINE with mechs around the world.



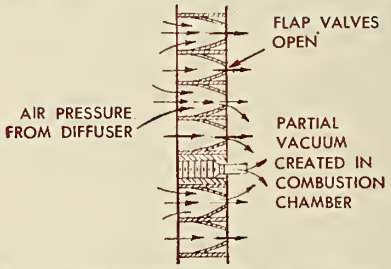
OPERATION OF ROBOMB ENGINE



Charging Phase. With robomb in motion the force of inrushing air builds up pressure in diffuser. Flapper valves in grid open, and air rushes into venturi section to mix with fuel from 9 jets.



Exploding Phase. Hot walls of gas-combustion chamber ignite the fuel-air mixture which explodes, sealing inlets. Gas pressure, exhausting from tail pipe opening, gives robomb its forward thrust.



Replenishing Phase. Inertia of the escaping gas reduces air pressure in chamber below atmospheric, causing grid flapper valves to reopen. Process is repeated 40-50 times a second.

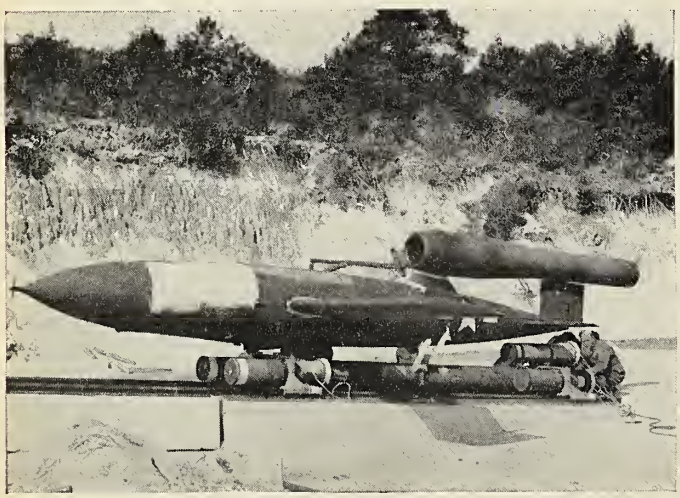
Robombs — Made in U. S. A.

The original version of the German buzz bomb was simply a high speed airplane built around a one-ton explosive charge. As such, it was vulnerable to fighter interception, antiaircraft fire and balloon barrages, and with launching and control problems still unsolved, it could not always be accurately aimed.

Bearing the German shortcomings in mind, AAF experts set to work to design and build a robot bomb that was based on the enemy's V-1. Miscellaneous parts of some 40 V-1s were flown across the Atlantic to Wright Field for study, and after research and tests by ATSC technicians, in collaboration with engineers of commercial firms, complete specifications for the jet engine, automatic control equipment and rocket-propelled launching car were turned over to leading manufacturers for production. The result was a robot bomb that could reach a speed of 400 to 440 mph at an altitude of 6,000 feet and achieve a theoretical range of approximately 150 miles.

In appearance, the home-constructed robomb looks like a midwing monoplane with very short wings, a stubby tail and a long pipe (the jet engine unit) mounted above and behind the mid-section of the fuselage. Wing span is 17 feet, 8 inches, and, like the tail, wings are symmetrical airfoils. On the nose of the 24-foot fuselage is an air log propeller which counts up air miles until a pre-set number is reached, at which time it flips the controls to dive the bomb onto its target area. From nose to tail, the fuselage houses a magnetic compass, a 2,080-pound HE warhead unit, a fuel tank with capacity for 157 gallons of low-grade gasoline, compressed air bottles which supply air for operating servomotors and for pressurizing fuel, and an automatic pilot. A radio transmitter, for tracking purposes, is also included.

In operation, the engine—a steel tube mounted on struts above the aft section of the fuselage—is started by a spark plug in the top of its combustion chamber, hooked up to a battery on the ground. It runs with a rich yellow flame until the external air supply is shut off, after which it emits a blue



Man prepares to fire rockets which will launch robomb into the air.

In flight, expended rockets and launching car drop to the ground.

flame and intensifies its roar as it develops a greater thrust force. Thirty seconds later, the launching rockets are fired and the robomb soars into the air, together with its launching car. When it reaches a speed of 260 mph, the rocket-propelled launcher drops off and the flying missile continues on its preset course by jet propulsion.

The autopilot maintains lateral stability by application of rudder control, since there are no ailerons. Constant pressure altitude is brought about by an aneroid element on the autopilot which operates the elevator servomotor. The magnetic compass monitors the controls in azimuth to hold the robomb on its established course.

When the robomb approaches its target, the air log propeller on the nose operates a mechanism which arms the warhead, starts the radio transmitter, sets the elevators in a dive position and dumps the spoilers on the underside of the tail.

Combustion Engine Principles

Two denatured oil cans, three ordinary auto light bulbs, a small motor, a piece of plywood and a few nuts and bolts were all that Lt. Byron A. Susan, ground training instructor at the 20th Ferrying Group, ATC, Nashville, Tenn., needed to construct a device which graphically acquaints Ferrying Division flyers with the basic principles of timing in a four-cycle internal combustion engine. The training aid, mounted on a piece of bankboard, shows airmen exactly what goes on under the cowling of their planes when the timing is changed, without recourse to the complex arrangement of mechanical linkage usually required in other demonstration methods. The small electric motor operates the board, and the three lamps light up in sequence as the three elements of intake, spark and exhaust complete their cycle.

Reversible Pitch Props

Reversible pitch propellers that can stop our heaviest bombers in one-half their normal landing run and can slow a P-47 down to 250 miles per hour in a vertical dive are emerging from the experimental stage.

In 1942, a B-26 and a B-17 were equipped with propellers of this type. After further refinements, they now have been proved practicable for tactical use.

Because reversal of propeller blade angle during a dive develops airflow turbulence around the airplane—thereby inducing strong buffeting forces and instability—adoption of the props for

tech topics . . . about aircraft and equipment

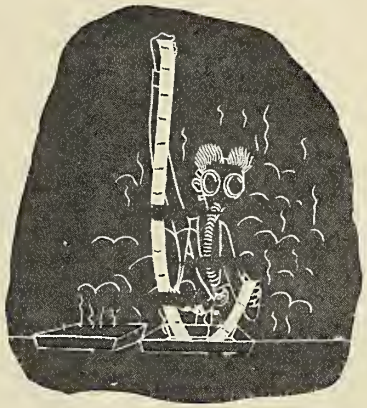
Tests are being run with a tiny, 3,500 pound, all-wood fighter built by Bell. The small ship has conventional engine design (unlike the other Bell fighters), is powered with an inline Ranger engine and has a tricycle landing gear.

An aluminum alloy, designated as R-301, now goes into aircraft construction. Reportedly, the metal is tougher and weighs less than alloys previously used. In some areas, heavy sheets of this metal are used to replace steel armor plate. . . . Pre-stretched aluminum appears to have desirable characteristics for fighter aircraft. Its strength-weight ratio has been increased considerably over that of ordinary heat-treated aluminum.

Bucket-type seats in cargo planes are being replaced with lightweight, canvas benches, which can easily be converted into bunks. A special, tie-down grid pattern has been adopted so that the seats can be installed in any type of plane.

Noise which seriously interfered with gunners' aim during operation of K-14 and K-15 sights has been eliminated with a special noise filter applied to sight motors. . . . A new instrument, the Horsepower Indicator, permits direct reading, on the same dial, of both net horsepower output and brake mean effective pressure. Previously, a flight engineer had to compute the differences mathematically. . . . Latest tachometer for fighter planes has a dial with more rpm graduations on it.

Powerful illumination equipment installed in fast photo planes permits use of the strip camera for night photography. . . . A U-shaped camera with many novel features is producing better high-altitude pictures. A modification of the 60-inch K-22 camera, it has optically flat mirrors which permit increased focal length without prohibitive size. An electric heating system and blower keep it at moderate temperatures for high altitude operation. . . . New gases now being studied may permit a revolutionary dry developing process for AAF photo groups.



Small signal lights in the bomb bay of B-17s tell crewmen when to prepare for egress. . . . A mock-up panel of all standard B-17 navigational instruments is used for testing dexterity and traction in gloves. Wearing various kinds of gloves, personnel perform a series of switch and dial manipulations and timers record operations with bare hands against those with gloved hands. . . . A pigskin lining improves cold grip qualities on the standard F-2 glove.

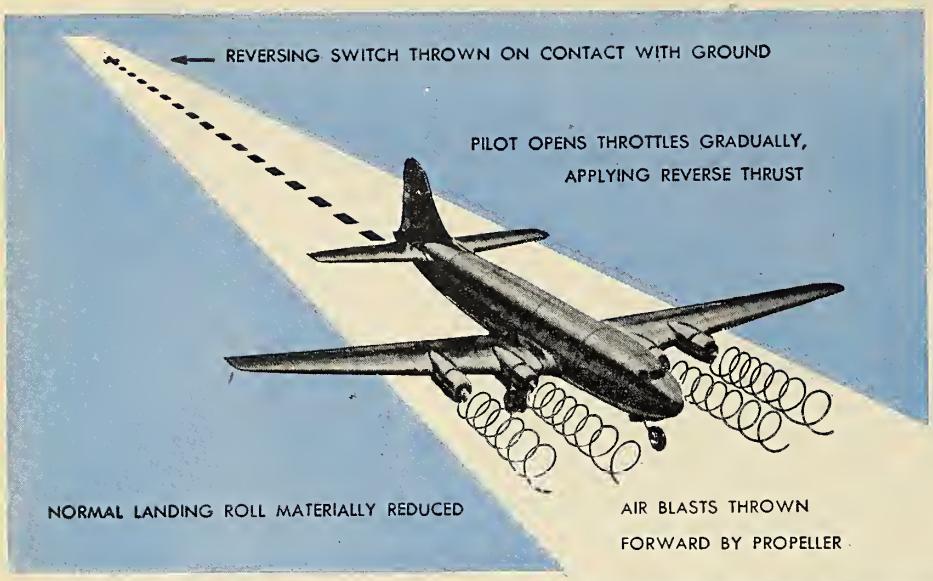
Flexible inner glove permits handling of cold parts which, handled with ungloved hands, result in painful skin peeling.

The A-10 sextant has been equipped with an automatic auxiliary instrument that will average any number of observations made during a two-minute period. . . . New flight gyro analyzer allows checking of C-1 automatic pilot gyros without removing them from the airplane.

Changes in carburetor systems of B-24s are being adopted to obtain better cylinder-temperature patterns and to improve cooling of the engine. . . . A simplified ignition system, to be installed in the R-2800 series engines, helps to do away with high-tension leads, reduces the chance of electric flash-over and makes possible more efficient operation at higher altitudes without pressurization.

Gun heating covers, resembling heating pads, are being wrapped around breeches of .50 caliber guns to keep the pieces always at firing temperature. The units are of cotton fabric impregnated with a special synthetic rubber compound which acts as a conductor. The current is carried by tiny, bare, copper wires and heat is generated by electrical resistance.

Several thousand hours of tests have been run on improved materials for turbosuperchargers. New metals allow the turbosupercharger to run at higher speeds and permit more efficient engine operation at higher altitudes.



Aerodynamic braking by reverse thrust is accomplished by changing the angle of propeller blades to negative pitch, thereby creating backward thrust without revising the direction of prop rotation. Tests show a 1,600-foot saving in the landing run of four-engine aircraft.

dive-bombing is being tentatively withheld. When the disadvantages are overcome, however, the reversible pitch propeller may replace dive brakes.

The four-blade propellers used in tests with heavy bombers are 16 feet, 8 inches in diameter and are made by the Curtiss Propeller Division. Their blade gears permit change in blade angle from plus 90 degrees to minus 30 degrees, a 50 degree increase of blade angle range over conventional propellers. Modification of the propellers for reverse pitch operation requires only an additional relay, wiring and a voltage booster for each propeller.

In landing tests, with a four-engine bomber, it was found that reversing the pitch of outboard propellers is slightly more effective than inboard propellers. Installations generally permit the pilot to select only two propellers, either outboard or inboard, since the negative thrust of two propellers when used with brakes will reduce the average landing run of a heavy bomber to about half and, without use of brakes, will limit the landing run to a distance 20 percent less than that required with normal braking.

In tests conducted at Wright Field, the results were a 1,600-foot saving in the landing run.

After the wheels touch the ground, it takes five to six seconds for the propellers to move to maximum negative thrust angle. However, their braking effect begins two to three seconds before maximum negative blade angle is reached.

At Ladd Field, Alaska, a B-26 made approximately 80 reverse pitch landings in testing effectiveness on snow-covered runways. Definite advantages were obtained on hard-packed snow, less advantage on loose snow, which, incidentally, blows ahead of the reversed-pitch propellers in clouds that impair landing visibility of the pilot.

Reversible pitch propellers also are advantageous on wet grass and muddy fields where wheels skid when brakes are applied. These props actually can taxi a plane backwards, although their use for flight line maneuvering is of relatively minor importance.

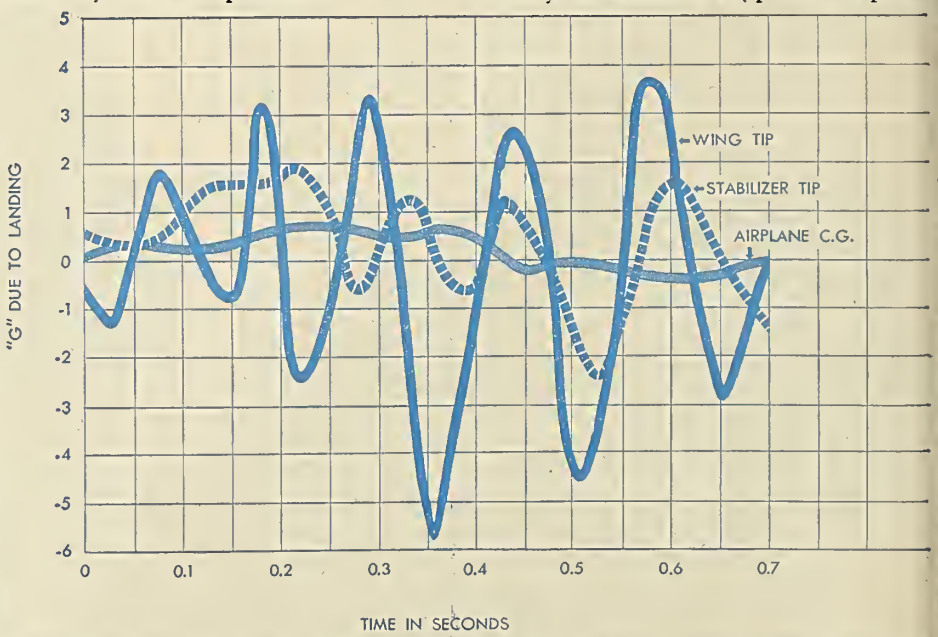
Heated Goggle Lens

Newest addition to the B-8 Goggle Kit for fighter pilots is a clear, plastic, electrically wired, interchangeable lens. Thin wires are laminated into the plastic to warm the air around the eyes and prevent condensation and freezing of moisture on the lens. Small wires lead from the fighter's main electrical unit to snaps on the lenses. Now standardized, the unit is being distributed to theaters of operations on the basis of one lens and cord for each fighter aircraft. Other components of the goggle kit, previously standardized, are three clear plastic wind-foil lenses, two amber haze-foil lenses for haze penetration and four green glare-foil lenses for use when glare is excessive. All lenses are interchangeable, requiring less than one minute to remove one type and substitute another.

Landing Stresses Studied

The Air Technical Service Command, through its "landing laboratory" at Wright Field, is contributing to the establishment of the most reliable data on landing stresses ever obtained and is solving many of the previously unknown problems in designing wings, tails and landing gears of the superbomber and super-transport airplanes of the future.

Acting on the assumption that many stabilizer failures on heavy bombers were due to the stresses and strains set up during landing techniques, the ATSC's engineering division decided to "X-ray" reactions of all parts of a plane



Graph shows typical results of stresses and G forces on heavy bomber during landing, as recorded by special instruments. Engineers report that immediately after initial impact, wing and stabilizer tips oscillate through many cycles, imposing severe strains on plane members.

when landing. Scores of landings were shot, good ones and bad ones, on concrete and on sod. Stresses and G forces on tail assemblies, wings, fuselages and landing gear were meticulously measured and charted through the use of newly developed test instruments which registered structural loads during flight maneuvers and landings.

It was discovered that during the first half-second after the initial landing impact, wings and stabilizers oscillate through three and sometimes as many as twelve cycles, imposing strains that can lead to fatigue failure of structural members after many rough landings. For example, the G force with relation to the impact force at the CG of a B-24, may be two and a half times as great in the tail gun position, five times at the outboard engine, eight times at the stabilizer tip, and twelve times as great at the wing tip. These severe stresses reach their maxima at different instants of time, but usually within three-fifths of a second after initial landing impact.

In another series of landing tests, a B-29 was equipped with electrical oscillographs that simultaneously recorded the readings of accelerometers and strain gauges at 36 different locations on the plane. By this means, the engineers were able to record a complete time-history of stresses and loads under all types of landing conditions.

In general, tests showed that wings—particularly those with engines and fuel tanks in the outer sections—tend to oscillate more severely during bouncing landings, that one-wheel landings accentuate stresses on the wings but may relieve them on the horizontal tail of the B-24, that application of brakes immediately after ground contact imposes additional strains on the wing and tail structures.

Findings indicated that some landing gear were heavier and more rugged than was necessary to absorb the landing impact, and recommendations were made for reduction in weight. It was also revealed that concrete landings were about 25 percent rougher on the airplane structure than sod landings.

'Mirrophone' Trainer

A handy device now used in the aircrew training program is the Type S-1 Communications, or "Mirrophone" trainer. It is a magnetic tape recording device designed to make records of one-minute voice communication passages for immediate reproduction. Although its main purpose is to assist the instructor in improving diction in interphone

maintenance tips . . .

from the crew chief's stand

ATSC handles more than 500,000 different items of tech supply, so if you can't locate what you want try the new Aircraft Accessory Supply manual series. Now on limited distribution, they list part numbers and nomenclatures on all accessories items, including all information available on supersedures, interchangeability, cross references and airplane application of standard parts. Data is identical with HQ ATSC stock record card files, and a rapid check on a non-available item often yields just-the-thing-you-want dope on substitutes, thereby saving time and trouble.

Charging a battery doesn't necessarily mean a bare-handed assault on a machine gun position. To maintenance men it's a delicate job that requires a proper adjust-

ment of the voltage regulator. If you allow an excessive input to the battery, overcharging will result and plates will granulate and buckle. Refer to TO 03-5B-1, and make this adjustment carefully.

Life is what we make it, but the use of glycerin in testing type K-1 oxygen pressure gauges may make it considerably shorter. UR's report that glycerin and related fluids brought into contact with oxygen during field activities are a fire and explosion hazard. Oxygen equipment should be tested in accordance with TO 03-50-1, dated 1 July 1944, and kept free of oils, greases and other foreign materials.

New TOs requiring special distribution are handled by the 00-80 series which provides for the following topics: 00-80-A Shipping, -AA Export, -AB Domestic, -AC Air Freight, -B Medical, -BA Aviation Medicine, -BB Air Evacuation and -BC Sanitation. Additions are forthcoming as required.

Tire tubes, life rafts, self-sealing tanks and other rubber appliances which are in need of repair have a better chance of getting back on duty status with the latest electro-magnetic vulcanizing method. A patch is placed over the hole or rip between a steel plate on one side and the electro-magnet on the other side. When the power is turned on, the magnet instantly draws the plate. Pressure and heat melt the patch, setting it permanently.

A rabbit's foot is a poor substitute for know-how when applying torque to fuel cell fittings. A few steps to the reference shelf and a quick look at TO 03-10J-3 will prevent many fitting failures. In making fuel cell connections, parts should be brought to the best possible alignment so that screws may be started with the fingers. The screws should then be tightened to three-fourths of the required torque before applying the full maximum needed. This gradual build-up of pressure equalizes the strain and thereby reduces possibility of rupture of the molded synthetic rubber stock. Screws with worn threads should be replaced, and those in use should not be tightened repeatedly since this practice doesn't prevent but actually contributes to leaks. Use of sealing compounds or pastes is outlawed by TO 03-10J-3, because they affect lubrication between fitting surfaces, causing premature stock failure and fitting leakage.

Pilots of AT-7s and UC-45s have complained that they can't get a clear view of their instrument panel because of the location of the control wheel. This trouble can be remedied by removing the wheel and turning it 180 degrees so it drops down on the lap, thus affording an unobstructed view of instruments above the hub.

There are thousands of nuts that keep a fighter together, but it only takes one to scatter the plane all over the place. Noth-

ing personal, of course—just the sober fact that a single loose nut whose threads are stripped may often be cause enough for a plane to crash. Be sure to make careful inspections when assembling parts, and keep nuts tight.

what's wrong with this picture?

Warm up your wits and inspect this photo which depicts typical winterizing problem of applying external heat to a B-17 engine prior to starting. These three mechs know that ground heaters are of major importance in cold weather operation and need careful maintenance. But in many ways they are disregarding the operational instructions printed on the heater and the procedures outlined in TO-00-60B-1, dated 1 November 1944, TO-19-60-3, dated 10 April 1943, and TO-19-60-3A, dated 10 August 1944. So start the New Year right, and before turning to page 51, resolve to find at least 10 vital errors. The tongue-in-cheek models are T/Sgt. Harry E. Carey, S/Sgt. Robert L. Frazee and Sgt. Harvey A. Moore, 4000th AAF BU Flight Section, Patterson Field, Fairfield, Ohio.

and radio-telephone classes, the "Mirrophone" can be used as a continuous stand-by recorder for code networks from which the instructor can reproduce at any time the preceding minute's code sending. Most benefit results from the device when it is employed in conjunction with other training equipment, such as interphone networks and a noise generating system that duplicates operation in actual aircraft. Information on the availability of the "Mirrophone" may be obtained from the Training Aids Division, One Park Avenue, New York 16, N. Y.

AAF Model Heads

Four wooden heads are being delivered to every Army Air Force helmet manufacturing plant in the United States. They are models, precisely carved out of kiln-dried laminated mahogany, on which helmets are fitted for size prior to approval by AAF inspectors. Before the model heads were adopted, there was no satisfactory method of inspecting helmets for size. After measuring thousands of heads of airmen in training, the Aero-Medical Laboratory at Wright Field designed these four as typical AAF heads.

Reducing Wing Explosion Hazards

In carrying extra fuel in their wing tips, our long-range aircraft are faced with extra dangers when exposed to explosive and incendiary gunfire: the fire hazard from the ignition of gasoline in the wings, and the explosions that may result from fuel vapor in the wings and from vapor in the tanks as they are drained.

To lessen these dangers, the 8th Air Force has experimented with bleeding inert gases under pressure into the tanks, to exclude all oxygen and prevent accumulation of a combustible mixture in and around fuel reservoirs. The most common method is to employ CO_2 fire extinguishers, although the British have used nitrogen. Another system, developed in the States, ducts exhaust gases into the tank. These systems, however, are effective only so long as the tanks are intact. When they are ruptured, safety depends on wing-venting.

Two 15th Air Force B-17s which survived wing explosions in Italy furnished valuable data in this respect, since both had carried wing-tip Tokyo tanks at the time the explosions occurred. It was found that vents behind the engines were not blackened, indicating that burning fumes had not reached them, and, though the leaks proved to be in

the inboard tanks and not the outboard, fuel was found in the outboard panel. The Tokyo tanks were full but they did not go up in flames even though they were surrounded by burning vapor.

Subsequent experimentation with vents cut into wing tips provided a solution. Smoke tests on the ground and in the air showed rapid clearing of vapor. Air flow tests with streamers also proved that no aerodynamic complications accompanied the modification. Since these changes have been made, danger of wing explosions are practically eliminated.

Further research in the U. S. has led to consideration of individual pressure vents for each wing section. Wing section dams are also being installed to prevent leaking fuel from finding its way down to the turbo-superchargers. These dams will be provided with direct drains on the under side of the wings.

Captivair P-47

All the sound and fury of flight, coupled with the safety and serenity of old Mother Earth—that's the Captivair, a new link between advanced trainers and high-powered fighters, set up and bolted down by men at Seymour-Johnson Field, N. C.

Concrete pillars keep a Class 26 Thunderbolt fighter plane a few feet off the ground in a stationary position, and future P-47 pilots are exercised in every detail of cockpit procedure, routine and emergency, down to the proper fastening of a shoulder harness. Monitors in an adjoining control room can check, by means of a panel and controls, every move the pilot makes—or doesn't make. They also can fake an emergency, such as falling oil pressure or a defective hydraulic system, to see how quickly and correctly the pilot reacts.

New Fighter Camera

Rapid reconnaissance photography has become an added task for fighters in close air-ground coordination on the fluid Italian battle front. Previously, the job fell to the tactical reconnaissance and photo reconnaissance planes, but orthodox procedures could not keep up with the constant scene-shifting of ground warfare. Nor could the 16 mm gun cameras with which all fighters are equipped be of much assistance, because the film is too small and the focal length of the lens is too short to permit good enlargements.

With camera mounted in a special bracket under wing, fighters may photograph their own tactical strikes against enemy objectives.

The only solution to the problem, therefore, was to install an aerial camera into the fighters and let them photograph their own strikes. The camera would have to be mounted so as not to interfere with the plane's flight behavior or its ability to bomb and strafe. It should not add any additional duties for the pilot, nor reveal to the enemy by special markings, windows and the like, that the fighter was so equipped.

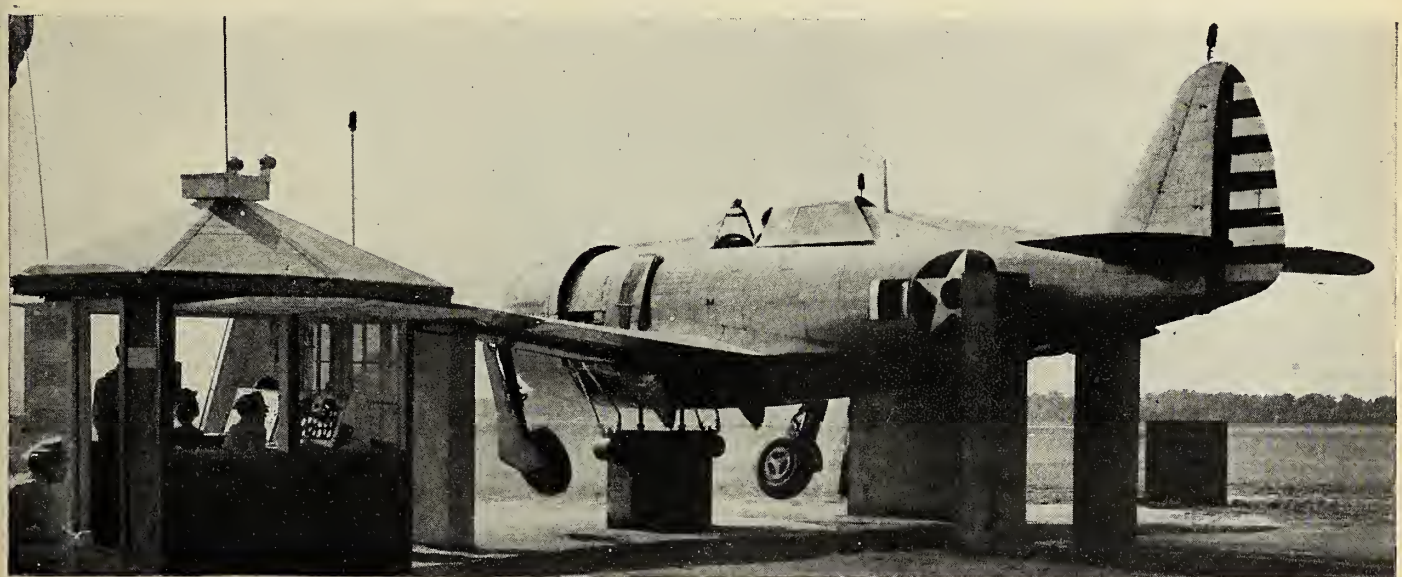
After several installations were made and tested, Lt. Col. H. B. Wesley, staff photographic officer of the MAAF, resolved these difficulties and was able to achieve a successful arrangement which performed satisfactorily in missions against the enemy. A standard Air Corps Model K-25, 24-volt camera was mounted in a special bracket fixed to the jack pad and the bomb shackle sway brace. This bracket was shock-padded with sponge rubber, and its top half had an arm extending forward to hold an adjustable clevis which enabled the camera to be raised or lowered for bore sighting.

Every precaution was taken to hold the camera rigid and to eliminate all movement and vibration. A special faring was constructed, held in place by three Zeus fasteners, and here again the camera was mounted in sponge rubber.

This camera installation can be made, with suitable modification, on any of our fighters.

Three-Dimensional Photo Effect

A process has been developed by Capt. H. C. Mulberger of the Base Photographic and Navigational Aids Section, I Troop Carrier Command, Stout Field, Indianapolis, Ind., for treating ordinary black-and-white photographs with fluorescent solutions so that prints, when viewed under ultraviolet light of the near-visible region (3300 to 3900 Augstrom units), show greater detail and appear to have a



This bolted-down Thunderbolt at Seymour-Johnson Field, N. C., trains future P-47 pilots in quick, correct reaction to emergency situations.

on the line

with mechs around the world

Mechanics in the CBI Air Service Command who formerly had blushed unseen are now achieving recognition under a plan introduced by Maj. Gen. Thomas J. Hanley, ASC commander in the theater, to seek out ground crewmen of special merit and to form them into an elite "honor society." Known as the "CBI Service Chiefs," the unofficial organization will be composed of enlisted men who have won the praise of their guiding officers by devising a time-saving mechanical gadget, improving a system of handling work, or in any way short-cutting a job through ingenuity in line of duty. Those selected are presented a card of membership, serialized as to number and signed by the commanding general.

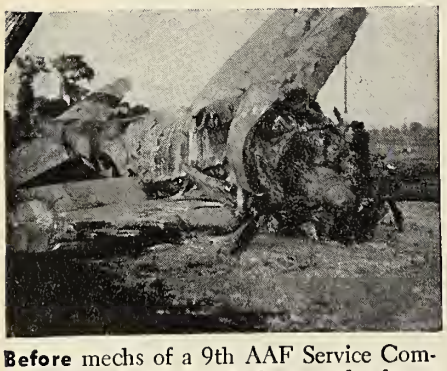
It's not easy pickings to select the right cylinder from among 18 in order to locate and remedy valve blow-by in R-2800 engines. But Sgt. John Piszczek of an airdrome squadron in the Pacific theater has developed a method of detection that rivals the best S. Holmes tradition. Knowing that with a reduction gear ratio of 2:1 a complete firing cycle takes place in two crankshaft revolutions and one propeller revolution (360 degrees), he figured that each cylinder fired at 1/18th of 360 degrees, or at every 20 degrees of propeller rotation. Putting No. 1 cylinder on the compression stroke, he marked a propeller blade for checking rotation, and with a 360-degree scale set with zero at the marked blade, rotated the propeller slowly until the blow-by occurred. By measuring the arc of rotation and dividing by 20 degrees (the interval for each cylinder passed) he found that he was able to spot the defective cylinder in the firing order.

Unless an error is made in reading the scale, the number of cylinders passed from the starting point until the blow-by is reached is equal to the cylinder's sequence in the firing order. Thus, if the propeller stops at 180 degrees, nine cylinders have been passed and evidence points to the ninth to be fired, or No. 17. Pratt and Whitney representatives agree that Sergeant Piszczek's system is a sound time-saver.

An aversion to "hangar queens" and a strong determination to see that every plane that can possibly fly gets into the air, lies behind the 372-day record of "No Airplanes Grounded for Parts" chalked up by the advanced twin-engine pilot school at Moody Field, Ga. Moody's supply officer, Lt. George E. Marsh, organized the "No AGP Section" to coordinate and expedite the flow of needed parts to the technical supply shelves. The maintenance division helped out by anticipating requirements, and there were weekly sessions of chiefs and clerks to plot against emergencies.

Training and operations chipped in with an express pick-up service at critical times, and shop maintenance and engineering personnel not only dug up parts when shortages developed but made them when necessary.

Dabbling in water colors, M/Sgts. Miller and Smoak, assigned to a service depot in England, have developed an ersatz sea marker packet for Mae Wests to avert a threatened shortage of standard packets. Using available sea marker powder, they made the packets out of toilet tissue, tape and cloth from old life raft sails. Because the dye seeps through the paper slowly, the colored area on the sea which guides search parties to a downed pilot lasts for nearly 10 hours. The sergeants have produced 2,400 of these marker packets in a single month.



Before mechs of a 9th AAF Service Command unit in France took over, the foamite-covered Thunderbolt shown above was just another wrecked and partly burned plane that seemed consigned for spare parts duty in the local air force salvage yards.

After 11 men went to work on the plane, however, it came back to life, good as new and spoiling for a fight. T/Sgt. Richard Common, Buffalo, N. Y., headed the crew of welders, machinists, electricians and specialists that did the job.

three-dimensional depth. The solution is prepared by mixing one part of fluorescein, an organic base powder obtainable through any drug supply company or medical section, with 1,240 parts of water, or 10 grams to 30 ounces. The formula, however, is not too critical, and considerable variation will not affect results. Aerial photos are especially adaptable to this procedure, and it is believed that prints so treated may be of value in radar instruction and screen interpretation.

Link Instrument Flights

At Shaw Field, S. C., flying officers reporting for regular Link trainer time have found that they can master realistic instrument flying without leaving the ground. A simulated air traffic control system, destination Chicago, enables rated pilots to go through every experience normally encountered in a real instrument flight to the Windy City. Capt. Clayton L. Berlinghoff, head of the Link department, made the plans and supervised the work, while enlisted men under M/Sgt. August B. Doppes and S/Sgt. Walter J. Willoughby completed the technical installations. A glass-enclosed "control tower" answers radio calls from as many as three Link trainers as they pass contact points on their routes after "taking off" from various parts of the United States.

Boon to Bombardiers

Since all bombing tables are given in terms of true air speed, the True Air Speed Indicator, type G-1, currently standardized, is simplifying computation problems for AAF bombardiers. The instrument automatically corrects the airspeed for altitude and temperature.

With the ordinary airspeed indicator, the bombardier had to read three dials — the indicated airspeed meter, altimeter and the free-air thermometer. Each of these had to be corrected by reference to Bombardier's Correction Cards, the resultant figures fed into a true airspeed computer and set into the bombsight. The new instrument automatically computes true airspeed.

The G-1 is a pitot static instrument that measures the difference between impact air pressure and static air pressure outside the airplane. A system of cams and sliding levers automatically differentiates between the pressure variations resulting from changes in airspeed and altitude. Temperature variations are corrected automatically in the instrument by a capillary temperature bulb that is attached to the under-skin

of the fuselage. This bulb is exposed to the air stream but sheltered from direct rays of the sun by a metal shield.

Designed and developed by the ATSC Equipment Laboratory instrument and navigation experts and the Kollsman Instrument Division, the True Air Speed Indicator weighs 2.3 pounds and is mounted on the bombardier's instrument panel. By comparison, it is 1.3 pounds heavier than the previously standard Air Speed Meter. The extra weight is due to addition of sensitive elements which permit automatic computation of pressure and temperature. Tested and recommended by the AAF Board, Orlando, Fla., the instrument soon will be standard in all AAF bombardment aircraft.

Wing Dents and Air Flow

It cannot be impressed too emphatically on pilots and ground crew mechanics, that only when a wing's surface and contour are perfectly smooth can a plane be expected to fly normally. A dent or crease in the leading edge—resulting from a carelessly handled gas hose, for example—may so disturb air flow over the wing as to affect controllability, cause buffeting, decrease the safety margin during landings, and even result in fatal accidents.

In small airplanes the effects are exaggerated; in large bombers they are less. Any turbulence, however, may have unforeseen results, particularly with high speed airplanes having low-lift wings, such as the P-51 or B-24. Many cases of tail buffeting are directly traceable to battered wing surfaces and, in severe instances, the tail surfaces have been torn off and the plane lost.

A detailed investigation of airflow turbulence resulting from abused wing surfaces was occasioned by the loss of an AT-11. In a subsequent AT-11 test, a pronounced buffeting, similar to that of a partial stall, occurred at 90 mph indicated airspeed instead of at the normal stalling speed of 63 mph. Careful check of the entire airspeed indicating system revealed no error there. However, by taping short cotton strings at six-inch intervals over the upper wing surface and observing behavior at a flight speed of 90 mph IAS, a definite turbulence just aft of the leading edge, inboard of the engine nacelle, was indicated. After landing, examination of this area revealed a buckled battery box cover and flattened wing skin between stringers. When the original contours were restored, a second flight showed smooth air flow and brought the indicated stalling speed down from 90 to 63 mph.

Casualty Bag Protects Airmen

An electrically heated casualty bag for protection of wounded crew members at high altitudes has been developed by the 8th Air Force. The bag maintains normal body temperature and permits injured personnel to be freed of tight clothing and properly bandaged without danger of exposing parts of the body to frostbite. Strap handles on each side facilitate lifting the patient and carrying him from the plane without unnecessary jostling and without use of a litter. The bag is buoyant and can float a 190-pound man in the water if the plane has to be ditched on its return from a mission. ☆

Floating on surface until he can be "rescued," this "wounded" aircrew member demonstrates the comfort which is afforded by the AAF's buoyant, heated casualty bag.

WHAT'S WRONG with the picture on page 48

1. The Sergeant on the left is pouring gasoline into the heater from a can connected to a rubber hose. If something goes wrong . . . AAF manual No. 30, Sec. XI-5 (Ground Safety Rules) specifies. "Bucket must be kept in metallic contact with container while gas is being poured."

2. A single spark and the boys may be in for a hot time of it. A spark of intelligence, however, would tell them that pre-heating an engine without having a fire extinguisher handy is a dangerous practice, as well as a violation of AAF regulations and TOs.

3. The kneeling mechanic is turning on the heater while his buddy is gassing it up. With gasoline fumes present, we strongly urge him to lower his other knee in the position of prayer.

4. Seems like the boys just can't hear our fire-hazard warnings. They've got the heater much too near the airplane engine. By turning it around and not kinking the ducts, it could be operated farther away.

5. And while we're on the subject of ducts, the sharp-angled bends they're using prevents heated air from circulating. Always open the ducts as wide as possible to allow greater flow of air to cold engines.

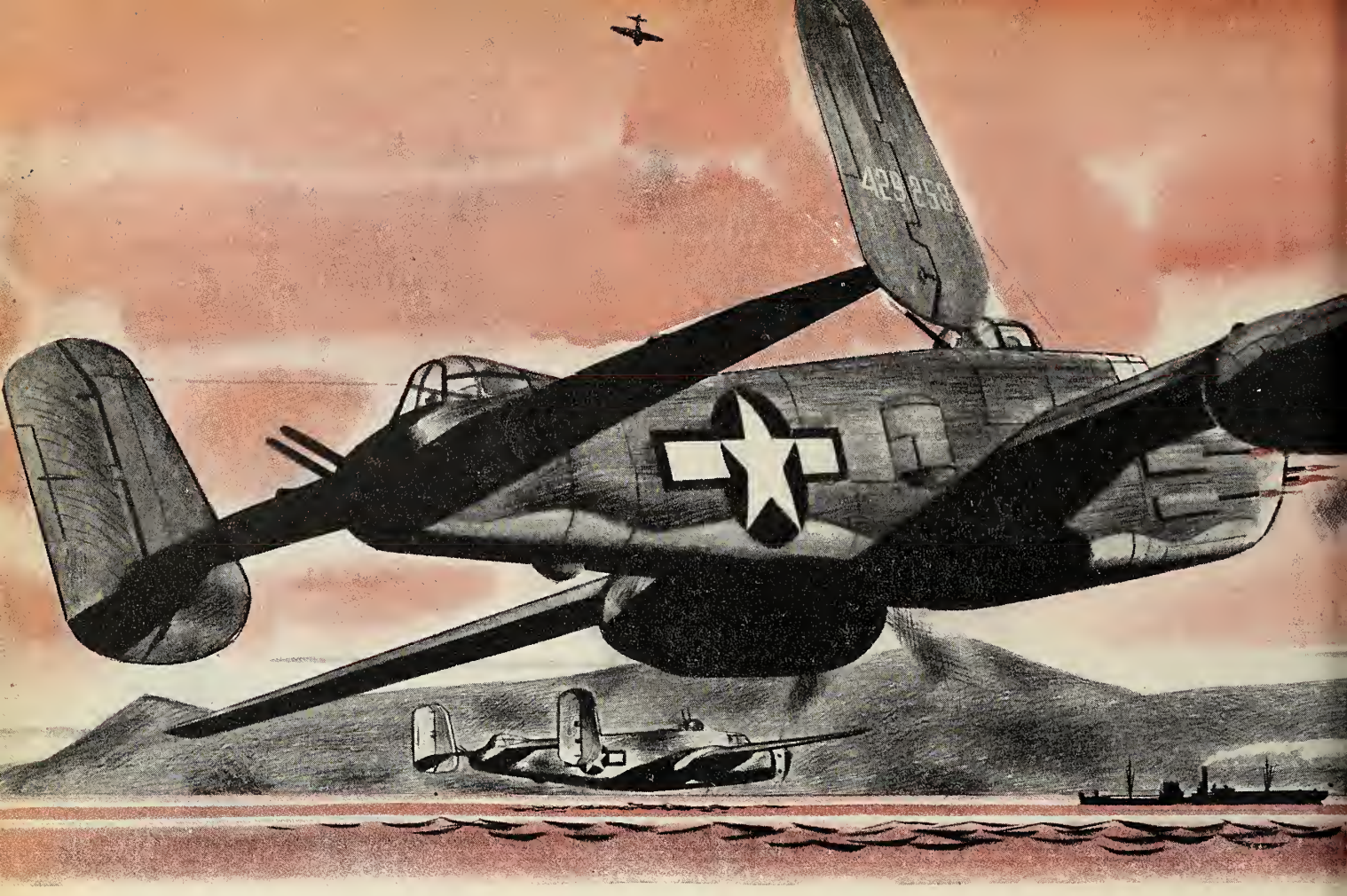
6. Moreover, the right heater duct has been left inside the retainer. While this is permissible, full utilization of heat is not obtained to warm up the engine.

7. Bet you never noticed that the canvas on the center duct is coming loose from the locking ring, and that the tears and breaks in the left duct canvas is allowing warm air to escape. A little repair work now and then is in order for the best of heaters.

8. Coming back to our chum on his knees, he obviously hasn't taken a peek at TO 00-60-3 which cautions against frostbite resulting when bare hands stick to metal surfaces in very cold weather.

9. See the pitot tube jutting from the fuselage? It should be properly covered while the plane is on the ground, to prevent entrance of dirt and foreign matter.

10. Now for the little man who has been "taking cover" on top of the engine all this time. He's left the cowling open and the tarpaulin is hanging loosely, allowing warm air from the heater to be dissipated. The cover must be skintight to prevent frost formation and to resist the tearing action of the wind.



What it Takes

BY MAJ. ROBERT B. HOTZ

14th Air Force

Here are some tales of the bomber boys in China who had what it takes to fight and fly. The bomber boys have no monopoly on these qualities, and you can find them just as readily in the icy altitudes over Germany or above a Pacific atoll as over the rice paddies and black mountains of China. But it is with the bomber boys that I have flown and lived and they are the ones I know best.

Perhaps the basic quality of a fighting airman is the instantaneous flash reaction to the incredibly rapid changes of air combat. Making the right decisions in those flashes is what brings you back to collect flight pay.

Take Lt. Bob Pettingell of Washington, D. C., for example. He has 56 combat missions under his belt without a scratch. Off Hainan Island last spring he demonstrated one of the reasons why. Pettingell and his wingman had flown through the South China night to reach Hainan Island just at dawn. Their target was shipping off the great ore-loading ports. The two B-25s were buzzing along just above the water with the rocky bulk of Hainan Island silhouetted by the rising sun when they were jumped by a patrol of 10 Tojos. There was no room for the Mitchells to maneuver—the stubby, black fighters were above and the water below. Two of the Japs peeled off on Pettingell's plane in a well coordinated attack. One came in high from the side in a beam attack. The other made a pass from just a little to the left of the nose, just out of the line of fire from the Mitchell's fixed forward guns. These tactics were designed to split the defensive firepower and make the B-25 easy meat.

Pettingell diagnosed the tactics in less time than it takes to tell about it. Calling to his turret gunner to take the beam attacker, he racked his Mitchell around like a fighter and went into a curve of pursuit against the Jap coming in from ahead. He punched his trigger button on the wheel and slugs from six fifties lashed across the Jap's flight path. Pettingell flattened out his bank and incendiaries showered around the Tojo like sparks off flint and steel. The fighter trailed black smoke and then blew up in a swirling puff of orange flame. At the same time the top turret gunner was chewing into the beam attacker with his twin fifties. While Pettingell was shouting "I got him!" over the interphone, the other gunners were watching the second Jap fall off smoking and crash into the sea. The rest of the patrol decided they had seen enough and went home.

A combat crew that isn't eager is hardly worth the gas it burns on the half-hearted missions it is bound to perform. To be eager when you are fresh from the States, is relatively easy, but it takes something extra after you have seen a few slugs ventilate the plexiglas and watched a few flamers hit the deck and explode.

Capt. Ronald Shirlaw was a real eager beaver. He came from What Cheer, Iowa, and everybody kidded him about that. Nobody kidded him about his 400-odd combat hours, or the time he fought his way for 15 minutes through Zeros and flak to dump his frag bombs on Kiungshan airdrome.

Shirlaw was leading the second of two flights scheduled to attack the airdrome at low level. Approaching the target

ILLUSTRATION BY 1ST LT. NORMAN F. TODHUNTER

These stories from China prove that when the going is tough, our flyers have what it takes—and more

he saw Jap fighters attacking the first flight and more coming up off the field. He had plenty of time to turn and outdistance the fighters. Instead, he called his formation to tighten up and plowed on to the target. The B-25s fought their way in and found plenty of Jap aircraft still on the ground to absorb their frags. There wasn't a plane in his flight that wasn't riddled by fighter fire and flak but they all got home after wrecking more than a dozen Jap bombers and fighters on the field.

You have to talk to his navigator-bombardier to get the details of the week when Shirlaw was shot down on the first mission, wounded on the second and then flew two more before the end of the week. On his first mission, Jap fighters intercepted the pair of Mitchells while they were skip-bombing the ore docks at Bakli Bay. His wingman broke off and headed for home. Shirlaw bored in to drop his bombs and then went after a flak position that had bothered his squadron for weeks, pumping 75 mm shells from his cannon into the gun pits. Slugs from a fighter punched holes in his wing tanks and he barely made it back to friendly territory for a crash landing.

He was back on the combat schedule the next day and led a flight on a sea sweep around Hainan Island. He sighted two freighters convoyed by a gunboat. Calling on his wingmen to hit the freighters Shirlaw went after the flak-stacked gunboat. On his first run at mast height a 20 mm shell exploded in the cockpit tearing his scalp with fragments. Shirlaw was momentarily knocked out. He couldn't toggle his bombs and came to just in time to avoid flying into the gunboat. Blood blurred his vision as he pulled away but he could see the gunboat wheel to protect the freighters.

"Are we going home?" asked the navigator.

"Hell no, I'm going to get that bastard," Shirlaw replied.

He made his second run, pumping cannon shells and spraying slugs from his forward-firing 50s as he closed the range. Two 500-pound bombs bounced across the water at the gunboat. One exploded underneath the ship and the other tore a hole in its side. When he left, the gunboat was burning and sinking.

Back at the base Shirlaw persuaded the flight surgeon to rig up an inconspicuous bandage. With the bandage concealed by his battered flight cap, Shirlaw bearded the operations officer to get on the next day's schedule. He would still be flying if the group commander hadn't come across his record and ordered him home.

When your skin is at stake it pays to try anything once. When the cannon-carrying 25s arrived in China there was a lot of barroom engineering as to whether they would fly on one engine. The slide rule boys figured that the extra guns and ammunition in the new model made it too heavy for single-engine performance. Nobody was anxious to give them a practical demonstration that they were wrong.

Lt. Ken Martindale of Syracuse, N. Y., was a trouble-shooter on New York state power lines before he joined the Army Air Forces. But he had never found as much trouble in upper New York as he did one summer afternoon on the upper Yangtze River. As pilot of a cannon-carrying Mitchell, he attacked a 300-foot transport deep in enemy territory. He made one run putting cannon shells and a 500-pound bomb into the transport. As he made his second run to finish it off, he suddenly caught a burst of flak that knocked out the fuel and oil lines in one engine. He had to feather the prop in a flash to prevent the engine from burning up. With less than 100 feet between him and the Yangtze, Martindale began a practical demonstration of single-engine performance with the heavy plane.

To complicate his problem he suddenly picked up an escort of eager Oscars. The Jap fighters had dived on the five Mustangs that were escorting Martindale and a merry fight ensued. The Mustangs shot down five of the 20 Oscars without loss to themselves, but four of the Japs were attracted by Martindale's feathered prop—a billboard urging attack. One pair of Japs were intent on shooting out the other B-25 engine when a Mustang shot them down. The other two Oscars withdrew.

The Mustang pilot called to Martindale: "Head for the clouds, I'll cover your engine."

The silvery gray cloud bank was 1,500 feet above the altitude where Martindale was nursing his crippled Mitchell. There was also a 4,500-foot mountain range to hurdle on course to the nearest American base. Flying on one engine was one thing; climbing 5,000 feet was something else. Martindale called to the crew to heave out everything they could to lighten the plane. Out went the machine guns, ammunition, radios, life raft and everything loose in the fuselage. Martindale began to ease his plane upward. The airspeed fluttered down, the heavy ship began to stagger and shake but Martindale kept coaxing it up. He got into the clouds and the Mustang headed for home. The crew called to Martindale and offered to bail out to lighten the load further, even though they were still over enemy territory. Martindale told them to buckle on their chutes and stand by.

The minutes dragged as the tedious race between the altimeter and the clock was run. For three and a half hours Martindale fought, nursed and cursed the weary Mitchell up, up, until the altimeter needle swung around to 5,000

feet. He held his leaden-winged bomber at that altitude over the ridge and then let down through the overcast to make a perfect landing at his base.

It is always hard to play on a losing team, but when your life is at stake it takes something more than guts to play a lost game to the finish. There were two of the bomber boys who played what looked like a losing game to the end. One lost, the other finally triumphed, but neither let down for an instant when the going was at its worst.

Lt. Robert Rymer, a bombardier from Asheville, N. C., had seen his share of flak and flame-winged fighters from the nose of a Mitchell. As his bomber swept in at tree-top height toward a big Jap airdrome on Hainan Island, he could see enemy planes in the revetments and others taxiing to take off. Flak was blazing from guns all around the field. His plane was hit in the left wing and engine. Flames licked around the cowling.

Rymer had a chance to get out if he jumped immediately. He knew what the odds were but he stuck with his plane. He dropped his frag bombs and took up his flexible nose gun to strafe. Men in nearby planes saw his bombs explode among parked planes on the field. A flight of Jap fighters headed toward the flaming bomber eager to get a share in the kill. Pilot and copilot of the wing plane saw incendiaries streak from Rymer's gun as the enemy fighters attacked in a head-on pass. Flames swept along the Mitchell's fuselage and cockpit as it headed out to sea. Rymer got a Jap fighter with a burst in the engine. His squadron mates saw the Jap hit the sea and explode just before the 25 plunged into the water. Out of the mass of flames as the Mitchell went down they could still see the glowing tracers spraying from Rymer's gun.

Fate dealt Lt. Jesse Weber of Bradford, Pa., what looked like a losing hand over Indo-China. His B-25 was plastered with explosive and armor-piercing shells while bombing a railroad bridge over the Red River. Weber was hit at the start of his bomb run and knocked unconscious by an explosive shell that tore up the cockpit and inflicted severe head wounds. Yet he completed his bomb run, dropped his bombs, closed the bomb bay doors and turned off the target, all by sheer guts and instinctive reaction to long and thorough training. One of the gunners managed to fly the plane while the navigator patched up Weber.

But the fates were not through with Jesse Weber that day. The Mitchell ran into severe turbulence and zero visibility. Some of the instruments had been shot away and others that were damaged began to malfunction making it impossible for the gunner to continue flying. Bloody and torn, Weber climbed back into the cockpit and began his fight to bring his plane and crew home. The weather was getting worse. The top of the cockpit was shot away and the icy blasts at 14,000 feet roared through the compartment. Weber was severely wounded in his back, neck, right arm and leg in addition to his head injuries. With only one arm and leg serviceable and only his basic flight instruments left, he fought the crippled plane through the darkening clouds. The oxygen supply gave out. Then the plane plunged into a thunderstorm. Icy rain, then hail and snow poured into the cockpit. Weber was suffering intensely from loss of blood, shock, lack of oxygen and cold. The radio compass went out. The buffeting of the storm grew worse and the Mitchell bounced up and down 4,000 feet in single swoops. Weber refused to give up. He fought the plane, the storm and his pain-fogged brain and eventually broke out of the clouds near his base to make a safe landing.

There is a quality that must rank even higher than quick, cool combat sense, raw courage and unflagging guts. Among the men who fight and fly, it rates above them all. It is the deliberate risk of your own life in trying to save your buddies. It is one thing to fight your way out of a desperate situation into which circumstances have forced you, but it is another matter to throw yourself deliberately into such a situation for the sake of somebody else.

Capt. Eugene Pawloski of Donora, Pa., is an excellent example of how this quality crops out in combat. Pawloski had his wing tanks holed during a low-level attack on a freighter. He sank the ship, but the gas streaming out through the flak holes made it impossible for him to make it back to his base. Gauging his rapidly diminishing fuel supply, Pawloski ordered the crew to bail out just before he estimated the tanks would run dry. One by one, they popped out until only Capt. Robert Guma of New York City, lead bombardier of the squadron, was left. As he was climbing out of his post in the nose, the ripcord of Guma's chute had caught on a projection and partially opened the chute. About that time, both engines sputtered and quit.

Pawloski had been flying on top of a solid cloud bank. He knew that the territory from the coast to his base was a solid mass of jagged mountains with only an occasional paddy-filled valley. He knew the long odds against finding a valley below him. And he knew that with both engines dead he could make only one pass at a landing. Pawloski could have ordered Guma to jump with his half-opened chute or he could have bailed out himself and left Guma to make his decision. No one would have reproached him.

But Pawloski stuck with the ship and headed down through the clouds. Guma came up to the cockpit and they sweated out the descent together. The altimeter needle whirled downward as the airspeed indicator picked up. Down and down they went.

Suddenly they broke out of the clouds. The peaks of the black mountains were behind them stretching up into the overcast. Ahead lay a valley marked by the pattern of rice paddies and dotted with small villages. They had missed the mountains by only a few hundred yards. Pawloski set the Mitchell down in a muddy rice paddy for a perfect crash landing and crawled out with only a few cuts and bruises. Guma was uninjured. They walked to the nearest village, hired a ricksha and rode back to their base. ☆

Hail and snow poured into the shattered cockpit.

The airborne army in Holland had to have supplies. The C-47s came through under fire

By First Lt. Joseph D. Guess

AIR FORCE Staff

When the full story of the "miracle" of supply is finally written, one of the most absorbing chapters will begin in the operations office of a wing of the 9th Troop Carrier Command, at its base in England.

The date was September 29, 1944. It had been nine days since the first paratroops and glider-borne fighters had dropped in Holland at the beginning of the greatest airborne operation in history—the attempt to turn the German line at Cleve.

The Wing, commanded by Brig. Gen. Harold L. Clark, had carried its share of those fighters to Holland. It had ferried across the First British Airborne, a Polish brigade and three-fourths of the U. S. 82nd.

But men must have supplies to continue fighting. Food and ammunition and guns. Blood plasma. For two days the need had been acute. But the English fog had held the Wing's planes firmly to the ground.

Today, at last, the fog was lifting and the sun was showing.

At 0800, it was decided to run the mission. Soon the motors of more than 200 C-47s would be making the ground throb beneath them at the Wing's bases. General Clark looked at his overall plan. One of his officers pointed out that the plan called for landing at three bases in Holland. They looked at their map of the day.

"The enemy isn't cleared from three field in this area," this officer said. "The situation is confusing there. At this moment we have no fields to land on." With his finger he indicated a point on the map two miles north of Grave and eight miles southwest of Nijmegen. "There's a small German fighter field there that may be cleared by this afternoon. But that's only one field."

"Give us three hours," said General Clark, "and one field and we'll land and unload all planes."

The C-47s were loaded.

By 1100 the German fighter field—1,000 yards by 1,400 yards—had been cleared. The Germans had been pushed from one to two miles away. Whether they could be held there was an open question.

At 1115 the first of the C-47s, its seams bulging with tightly-packed cargo, lumbered down the runway and took off for a field in Holland that might—and then again might not—be cleared of the enemy when it came time to land.

Meanwhile, a force of 8th Air Force and RAF fighters was readying for take-off to the same area. Obviously the Luftwaffe would challenge fiercely such a mass landing of supplies as this.

Probably the longest aerial supply train that ever headed for a front line nosed its way over the enemy coast before 1300. The sky wasn't too clear, and the sky train went in at low altitude.

Beneath it, a furiously speeding fighter escort plane occasionally would turn sharply upon a Dutch haystack or a lone farmhouse, spraying lead into a hidden flak gun that was trying to get the range.

Some of the fighter escorts went ahead to set up a ring of protection around the small field at Grave.

(Continued on Page 58)

Fighter Combat

Out of the years of air combat over Europe have come many new fighter tactics. Skillful pilotage is important, but the achievements of all great American fighter pilots in the European theater are based on more than mechanical skill. Their experience in battle shows that imagination, teamwork, careful planning, rigid air discipline and a continuing flexibility in combat techniques are needed to score victories over an ingenious and well-equipped enemy.

In the following comments, outstanding fighter pilots of the 8th Air Force express their views on tactics they employed against the Luftwaffe in air-to-air combat. As in last month's AIR FORCE article on ground strafing, "Down to Earth," some differences of opinion are apparent. These differences further emphasize the importance of flexibility.

Lt. Col. David C. Schilling, commander of the highest scoring P-47 group in the European theater, believes in the old adage that "a good offense is a good defense."

"No matter how offensive an individual or group of pilots may be, when outnumbered, they will at one time or other get an enemy aircraft behind them. The only good evasive action is a tight turning circle and if that doesn't put you on your opponent's tail or cause him to break or spiral down, then a series of diving aileron rolls until sufficient speed is built up to pull away will usually get you to safety.

"Once on the deck, skidding and jinxing the aircraft is the only thing to do, if still pursued. You must bear in mind that flying right on the tree tops is not satisfactory as there is too much danger of collision with ground objects.

"If, when attacked, you make a break at the right time, it will cause the enemy to make a very high deflection shot and sometimes overshoot, allowing you to pull in behind him. If you find it necessary to pull up into an attack, hold off until the enemy aircraft is in a head-on position, then do so and fire. Incidentally, I believe that in a head-on shot he who shoots first lives longest. You don't stand a very good chance of hitting anything, but it frightens your opponent and shakes his aim."

Maj. Robert S. Johnson, Thunderbolt pilot who bagged 27 German fighters in aerial combat, stresses the importance of keeping a constant watch for "bandits."

"A lot of green pilots fly good combat formation for the first, second, or third mission," Johnson says. "If they see no enemy, many of them get cocky and think combat is a cinch. They relax and maybe they get away with it for several trips over enemy territory. Then it happens. The first enemy they have contact with knocks them down simply because they didn't see him coming. They were too relaxed to kick the airplane rudders or roll the ship up on a wing and look behind them and above them as well as straight ahead or at their leaders. It's much better to come home tired from a sore neck from looking constantly in every direction than it is to leave the thing you sit on over enemy territory. Once in a while, it's a good business to put a wing tip up just over the sun and look around it too. Often there is plenty of company there.

"Any time you lose your wingman or leader, you've lost 75 percent of your eyes and fighting strength. Anyone can get it; some of the best have. So keep your eyes open."

Capt. Duane W. Beeson, member of the record-breaking P-51 group in the 8th Air Force, believes that the most important thing to a fighter pilot is speed. He says:

"The faster you are moving when you spot an enemy aircraft, the sooner you will be able to take the bounce and get to him. And it's harder for him to bounce you if you are going fast.

"Of course, keeping a high speed in formations is very hard because the formation falls apart and also because of trying to save gas. But it is an important thing for a pilot to remember when he gets separated from his group or when the formation is split up into small units. The aircraft that has speed has the advantage on the one that hasn't. It has the initiative because speed can always be converted into altitude."

Lt. Col. Mark E. Hubbard, a P-38 pilot who flew in combat over North Africa and Europe, emphasizes that leader-

ILLUSTRATION BY T/SGT. D. BROCKELL

Tactical tips from fighter pilots who fly Britain-based Lightnings, Mustangs and Thunderbolts against the still stubborn Luftwaffe

ship, formation and control of the unit are the requisites of successful fighter warfare.

"Leadership is necessary to plan on the ground and direct in the air," he says. "Formation is necessary to see the enemy, attack him and to defend yourself. Control is necessary to attack in force at the proper time.

"Formation is the line of battle which can be offensive or defensive as the situation requires, and the situation can change almost instantly. I am strong for a line abreast formation with flights spaced far enough apart for neutral aid. Squadrons should be within good visual distance, not more than two to three miles apart. Line abreast formation is as offensive as any other type and defensively the best.

"A most important consideration in fighter combat is 'know your airplane'. Use its advantages against the enemy and keep those advantages by knowing its disadvantages."

A battle to the death between two fighter airplanes frequently lasts no longer than a few seconds. According to Maj. Walker "Bud" Mahurin, one of America's foremost P-47 pilots with a score of 21 Germans destroyed in the air, the man who wins that battle is the man who has spent months in planning his methods of attack.

"Before I ever saw a Jerry," Mahurin recalls, "I used to spend hours just sitting in the old sack thinking just exactly what I would do if the Jerry were in such and such a position, and what I would do if he were doing something else.

"I think that it all paid in the long run. A couple of times I have been fortunate in running into just the situation I had dreamed of at one time or another. Then, I didn't have to think. I just acted, because mentally I had been in that very position before. I believe it helped—at least I would advocate it. I still do it and I hope I run into a couple more of the dream castles; it pays dividends.

"No combat is worthwhile unless the attacking pilot does his work in a very cool and calculating way. I think if I have things pretty well figured out before I make a bounce, I stand a much better chance of bagging that guy I am going down after."

Lt. Col. Everett W. Stewart, P-51 pilot who fought the war from the Pacific to Berlin, found that in escort work it is best to keep the squadrons compact and in a close line abreast formation.

"This gives better maneuverability between and around flak areas and prevents straggling flights and individuals," he says. "It is easier to fly than wide spread formations and still affords pilots ample opportunity to look around.

"In attacking with two ships, I like my wingman to drop back to a position about 250 to 300 yards out to either side, and about 250 to 300 yards to the rear where he can completely cover the two of us from attack. I do not like the wingman to be trying to shoot one down while I am shooting, unless, of course, we are in some so-called 'perfect' setup. I prefer to give him the next victory and let me cover. My wingman nearly always gets to fire if I fire, and they usually come home with a victory."

Col. Hubert Zemke, veteran Thunderbolt group commander and one of the high-scoring fighter pilots in the ETO, believes that every fighter must possess an inner urge to combat.

"The will at all times to be offensive will develop into tactics," Zemke says. "Meet the enemy at any and all angles, preferably head-on. Always launch the attack; don't wait around. Hesitant pilots seldom bring home the bacon. Once you make a decision or give an order, follow through; otherwise you will only confuse the others.

"Forever impress upon your juniors the enemy they lost. A record is never established by the ones that get away. Everyone is prone to let the tougher ones get away, yet it is found that one reaps only the benefit of his own aggressiveness. Fighting is developing your own breaks.

"When by yourself and seeing two or more enemy aircraft above, move away to get superior position and then attack. When you have your outfit with you, and the enemy has so much altitude that you'd never get to him, just stay below and in the rear of him. He'll be down.

(*Continued on Page 58*)

"I have never yet cut my throttle just to hang on the tail of an enemy aircraft. I always move past him, going just about straight up. You'll always win a battle as long as you can stay above. Take him on the next try. The idea of cutting the throttle, as so often heard, to allow the enemy to pass has never appealed to me. They're too good at gunnery. I stay with the enemy until he's destroyed, I'm out of ammunition, he evades into the clouds, I'm driven off, or I'm too low on gasoline to continue the combat.

"Never dispatch the entire outfit to engage an inferior number of attacking aircraft. Everyone will become disorganized in the break and following melee if all are used. If one squadron is overcome, then dispatch another squadron. The fight will be below you and you shouldn't have much difficulty. Don't be drawn away from your outfit but hover as top cover.

"It must be realized that a group flying properly together presents a front which prevents all parts from being attacked at the same time. Someone can always offer cover.

"Learn to break at the proper time and make a head-on attack. The enemy doesn't like it. Don't run. That's just what he wants you to do. He can't help getting right behind you if you are moving away. When caught by the enemy in large force the best policy is to fight like hell until you can decide what to do next."

Capt. Merle B. Nichols, member of an 8th Air Force P-38 group, emphasizes that no one in the Army Air Forces should give a damn who gets credit for the victory—just so the enemy is destroyed.

"In the ETO, or any theater of war, the individual flight leaders' initiative, how they cooperate and work together, is the deciding factor in how well a group shows up in combat," according to Nichols. "A too eager flight leader is likely to lose his wingman and sooner or later himself. Those who are over-eager get less victories than those who attack at the opportune time and try to make certain that the attack is going to be a profitable one.

"Whoever is in the best position makes the bounce. When one flight makes a bounce the other flight should remain as top cover and let nothing draw them away unless the flight doing the bouncing is being hit.

"Superior enemy numbers make little difference if you have the advantage, plenty of gasoline and can keep a part of your own number above the attack for cover. It is inadvisable to attack if coming home low on gasoline, or with a cripple in the flight. Never attack twin-engine aircraft until you have made certain they don't have an escort sitting on top. Attack only when conditions are favorable. An even trade of aircraft is not a good show."

Maj. Gerald W. Johnson, P-47 pilot credited with 17 victories and considered one of the most accurate marksmen in the European theater, believes that the element of surprise is the greatest advantage a fighter can have in combat.

"If you plan your attack right, the enemy will seldom see you coming until you open fire," he says. "Therefore you should hold your fire until you are in very close range, and then make that first burst really count. Because there might be something behind me, I always break off an attack in a very violent climbing turn.

"Most attacks are made from above and should definitely be planned so that you know before starting down that you will close on the enemy from such a position that you will destroy him, and also know how you recover from the attack to give yourself the greatest advantage and safety in climbing back up. Once you have started on an attack and have gone down quite a distance to get to the target, you should stay with him until he is destroyed. Otherwise, you have sacrificed your altitude and speed without accomplishing anything." ☆

SPECIAL DELIVERY TO NO MAN'S LAND

(Continued from Page 55)

At 1350 the first C-47 set its wheels on the dirt landing strip. Three hours—180 minutes—to land, unload and dispatch more than 200 large planes.

It was a task that might have unnerved the traffic control officers at the largest and best equipped airfield in England—or the U. S.

But there was no control tower at this field. There were no traffic control officers. There was sharp, vicious fighting a mile and a half away. There were squadrons of desperate Lutfwaffe fighter pilots trying to penetrate the Allied fighter ring. In the offing, the 8th Air Force and RAF fighters were mixed with the Germans in a great, swirling dogfight.

The first C-47s to land carried English antiaircraft personnel and equipment, including big Bofors guns. The ordinary unloading time for this cargo was three to four hours. They did it in 45 minutes.

At one time there were more than 100 C-47s on the field —100 closely parked, defenseless sky freight wagons. The men who were hurrying with the unloading knew they would be duck soup if even a half-dozen enemy planes could get close enough to strafe them.

Above the field, the traffic pattern was jammed with a long orderly line of cargo planes ready to land. One dirt landing strip was cluttered with those that had landed. Another strip was jammed with aircraft ready to take-off. And all traffic directions were coming by radio from one parked C-47 on the ground.

Yet there was not one moment of confusion.

The supplies rolled out on the field: 132 jeeps; 73 jeep quarter-ton trailers; 31 motorcycles; 3,374 gallons of gas for vehicles; 38,700 pounds of ammunition; 60,730 pounds of rations. In all, 657,995 pounds of combat equipment and 882 fighting men were unloaded on a field 1,000 by 1,400 yards.

While the Wing was making this great supply delivery—without which the unprecedented airborne operation would have failed—it also was loading many of the glider personnel that had been stranded in no-man's land,—taking them back to England so that they could fly again against the Hun.

Planes that were loading these essential men dropped out of the line that was squirming from the unloading area down a dirt strip to the take-off line; then, when ready, they edged their way back into the procession.

The Luftwaffe was going crazy trying to get in close enough to shoot up the C-47s. One force of 50 Luftwaffe fighters headed toward the field. Within a few blazing minutes, the 8th Air Force had shot down 32 of the Germans, probably shot down another and damaged eight. The remaining Huns scattered.

At 1650—three hours to the minute—the last of the C-47s took off. The job had been done.

Back to England they went, and landed. Not a single cargo plane had been lost in the most dangerous re-supply mission ever undertaken by air to the front battle lines. ☆

Answers to "How Sharp Are You?" on Page 2

1. B-25
2. A tiger shark head
3. Three (two 50s and one 75 mm cannon)
4. Three
5. Loading the nose guns
6. Pfc.
7. On a cartridge case
8. Sergeant
9. 350
10. Six

PREPARE TO BAIL OUT

(Continued from Page 41)

cord until you just can't hold your breath any longer. To fall from 15,000 to 10,000 takes about 25 seconds.

As you fall you'll find that you cannot control your body position in relation to the ground, but that doesn't matter at all. What you can do is control your body in relation to itself, and you should. Straighten out your legs and put them tightly together so you can feel your ankles touching—if you curl up in a ball you'll probably somersault and may roll up in your own chute as it opens. If you keep your legs apart you may get a load of shroud lines in the crotch with a hell of a wallop. Legs straight, feet together, head down and eyes open—look at your ripcord and go to work. Unless you jumped from above oxygen level, your first assignment as soon as you're clear is to get the parachute open. If you're wearing a seat or back pack, hold the pocket with your left hand and pull the ripcord with your right. This will preclude fouling your arms or hands in the chute. If you have a chest pack just keep your left hand close to your body as you pull the ripcord with your right.

The chute opens. The number of parachute failures among packs that have been checked at proper intervals is very close to zero—although the parachute is almost always blamed in fatalities. For instance, when Colonel Boynton was killed many newspapers reported that "his parachute failed to open"—which ignored the fact that for some reason his ripcord was never pulled.

So, unless you've been keeping beer in it or neglecting it shamefully, your chute will open. The shock with which it slows your fall depends on many variables such as your body position, speed and weight. In some cases, it cracks you hard across the shoulders while in others the whole business is gentle, almost caressing.

If your harness is properly fitted and your legs are straight and together the opening should be easy.

Look up and see if everything's in order with your silk friend. If it isn't, there are an amazing number of things you can do in a short time. Should the shroud lines be fouled you can frequently shake them free; if a line is over the canopy it often can be teased back into position.

One lieutenant colonel of paratroops, for instance, looked up to find that his chute was streaming out behind him in a bundle, not bellying at all. As he fell through other paratroopers he could be heard swearing to himself while he worked at the lines. At about 300 feet he got the chute open and landed well.

With the parachute performing properly your next problem—beginning immediately—is to prepare for the landing. That's what you should be doing during the descent, not admiring the scenery or indulging in such fine points of technique as slipping toward a preferred spot or trying to stop oscillation. Those are tricks for experts. Your job is to be ready to land in correct body attitude, facing the direction of your drift. Make a driftmeter by looking down between your own feet and noting the direction in which you're travelling.

If you want to turn to the right reach up behind your head with your right hand and grasp the left risers. With your left hand grasp the right risers so that your hands are crossed, the right to the rear. Pull with both hands at the same time—and lo and behold, you turn right. To turn to the left reverse the procedure—the left hand to the rear.

As you prepare to land grab your risers even if you didn't have to make a body turn. Your feet should be together as you approach the ground, and your knees slightly bent so that you'll hit with the balls of your feet. Don't be limp and don't be rigid. You want a spring in your legs, since you'll make contact with about the same force as if you'd jump free from a height of 12 or 15 feet. If the "not limp but not rigid" stuff sounds like double talk, ask someone who knows how to ski to explain it. Most skiers hold their legs and knees in something like the shock-absorbing position recommended for a parachutist's landing.

Water landings are safe if you know what to do. The major points to remember are: 1. do not leave your chute until you hit; 2. undo your chest strap before landing so that your Mae West can be inflated. Once in the water, danger of fouling comes from the canopy and shrouds, not the harness.

At the moment of impact you should fall forward or sideways in a tumbling roll. Thereafter, if your parachute is dragging you, it can be spilled by hauling in on the lower suspension lines—those nearer the ground. If there's a strong wind blowing you may have to roll over on your abdomen and haul in hand over hand. Keep right on pulling until you hit silk. Then drag in the skirt of the canopy to spill the air and collapse the chute. If you can't manage this maneuver on your face, roll over onto your back, but keep hauling on those bottom lines. A strong wind considerably increases the injury rate, and your best protection is to spill the canopy quickly to keep from being dragged. You're down, and, in most cases, enjoying a heady feeling of well-being and accomplishment. It's very common for maiden jumpers to want to go up and try it again right away.

If you're coming down in trees, put your arms in front of your head, burying your face in the crook of an elbow to protect yourself from cuts and bruises—but keep your feet and legs ready for the conventional landing in case you don't hang up in the foliage.

As for water landings, they represent a special circumstance, but let it be said in advance that you do not have to have the single-point release parachute. As long as you're wearing a Mae West whether you can swim and whether you have ever jumped before, you can manage a water landing in any of the standard Army parachutes. Thousands have.

The moment you see that you're going to land in water, get ready to hit—remember it's very difficult to estimate height over water. You may be hundreds of feet up or ready to wet your feet, so be prepared in time. The one essential thing to do is to unbuckle the chest strap of your harness so that you can inflate your Mae West when you hit. Here are the official instructions: 1. *Throw away what you won't need.* This refers not to yesterday's lunch but to such bric-a-brac as steel helmets and oxygen masks. 2. *Pull yourself well back in the sling harness.* 3. *Undo your chest strap.* 4. *If there's time you can unfasten the leg straps one after the other and keep yourself* from falling by folding your arms or hanging on to the risers. You can undo the leg straps or slip out of your harness in the water. It's the shroud lines and canopy that may foul you, not the harness. If you're wearing a quick attachable chest pack unsnap it in the water. Get clear of the chute, leaving the harness until later. It's very light and won't bother you much. 5. *When you hit, get clear and stay clear of your chute.* Don't leave it until you do hit. Think it out now.

If crews understand their emergency equipment and have been drilled in its use, fatalities will decline sharply. For instance, one P-38 outfit now in the Mediterranean required all pilots to make dry-run emergency exits as routine ground training on non-operational days. The pilots practiced opening hatches, sliding onto the wings face down, and slipping off head first into the arms of loving crew chiefs. Since then, this group has had four emergency bailouts with not one injury or fatality.

As more and more physical training instructors become qualified to teach landing technique, an increasingly large percentage of newly graduated aircrew members will have had practical training in the use of their chutes.

Meanwhile, all of us who have not had such modern advantages should sit down and give a little thought to precisely what we'll do if and when. If you once learn, digest and understand the instructions repeated here and given in the Information Files you'll remember them automatically when the time comes. ☆

AIRLOCK IN ITALY

(Continued from Page 35)

Enemy shipping, like land transportation, was soon forced to move at night and lie up by day. The bigger harbors were at first profitable bomber targets, but finally the fighters drew the assignment to hit both these and the smaller anchorages. They harassed unloading points at night whenever they could spot any activity and kept the Germans from getting their stores out of the way before daylight came and with it these fish-in-barrel targets.

All through the Assault phase of CORONET, the steadily increasing pressure from both ground and air showed itself in the sense of urgency, if not of desperation, that began to appear in the enemy's movements. By their ever-increasing number as well as by their stories, prisoners confirmed the chaos and destruction which were cracking the German defenses. The Exploitation phase had begun.

The 24th of May, with more than 3,200 sorties and well over 3,000 tons of bombs on roads, railroads, supplies, trucks and tanks, marked the beginning of a period of relentless air pounding unprecedented in the MTO. When the break came, the fighters said in effect to the bombers, "You set 'em up and we'll knock 'em down." The bombers responded by creating road blocks in critical passes which forced traffic jams involving hundred of vehicles that in turn became so many clay pigeons to the machine guns, cannon, and bombs of the Tactical Air Force.

Even the most sanguine airmen found it difficult to accept the reports of vehicles and equipment destroyed. But as the Army moved forward, confirmation came in the actual count by ground survey parties. For instance, over a short stretch of road near Forli where the air claims totaled 117 motor transport and armored vehicles destroyed, the ground forces counted 122 blown up or burned out by air attacks. This corroboration, repeated many times, convinced even the most skeptical. An all-time high came on June 4 with 657 wiped out. The total for that month exceeded 3,000.

An example of one day's activity for one fighter group in MAAF is the account contained in the unit citation for the 86th Fighter Group. After Allied armies broke the 7-month stand at Cassino and plunged northward, powerful German forces attempted to reform on a line between Frascati and Tivoli where they proposed to stop the Allied advance short of Rome. On May 25 Tactical Air Force ordered the 86th Fighter Group to disrupt this strategic maneuver. "Taking off at 0650 hours on 25 May," the citation reads, "the first flight began a gruelling battle with enemy transports, diving through intense, accurate antiaircraft fire to bomb traffic, effect road blocks, and create confusion, repeatedly returning at minimum altitude to strafe the streams of enemy reconnaissance cars, personnel, carriers, trucks, tanks, and horse-drawn artillery moving to the rear. When the final four-ship flight landed that night at 2020 hours the 86th Fighter Group had, in 12 missions and 86 sorties, destroyed 217 and damaged 245 enemy vehicles, inflicted an unknown number of casualties on hostile personnel, silenced several gun positions, and interdicted the highways into the town of Frosinone, Cori, and Cescano. . . . This dawn-to-dusk aerial hammering, coordinated with the terrific assaults made upon adjoining areas by other units of the Tactical Air Force, so crippled the enemy's transport system and disorganized and decimated his ranks that he was forced to abandon his projected defense of Rome and hastily retreat northward to escape complete annihilation."

Taking full and immediate advantage of this breakdown of the German armies, General Clark's Fifth Army entered Rome on June 4 and 5 and shortly thereafter continued with the Eighth Army to move northward. This was the beginning of the Sustained Offensive phase which resulted in steady progress to the general Pisa-Florence-Rimini line.

Since then, there has been little change in the employment of the tactical air forces in Italy. The object continues to be to hammer away at the enemy's supplies and make him incapable of withstanding the land attacks.

In terms of effort, operations STRANGLE and CORONET were expensive, totalling together, 137,949 effective sorties and the expenditure of 84,603 tons of bombs. For the 102 days from March 15 to June 22 this averages 1,352 sorties and 843 tons a day. In terms of aircraft losses, however, the campaigns were economical beyond hope. MAAF lost a total of 803 planes, or about one-half of one percent of total effective sorties.

CORONET has been discussed here from the air viewpoint but in doing so, it is not the intention to minimize the role of the ground forces. The battle is recognized as a well-coordinated operation involving clear responsibilities for land, sea and air. No airman believes that the air effort alone compelled the Hun to break below Rome and to keep withdrawing above Rome. It would be equally inaccurate to believe that the ground forces could have forced a determined German Army to withdraw from its superior defensive positions unless the air forces had strangled its flow of essential supplies, disrupted its movements and attacked its strong points on the battlefield.

CORONET was a synchronized assault —an outstanding example of *mutual* support. It is axiomatic that the success of combined operations depends upon the complete coordination between the services. The means adopted in the North African campaign to insure this has served this theater well.

Air, ground, and sea commanders are each independent but they are bound together by the common objective. At Army Group, Army, and sometimes Corps headquarters levels, they and their staff live, plan, and cooperate together. Without sacrificing independence or submerging individual identities, the team works like the fingers in a clenched fist.

This is the system, the formula for attack that grew up in the Desert Victory. It has survived and sharpened its striking edge in the Battle for Italy. ☆

Rendezvous

(Continued from Page 30)

I wait for my element leader to break after them. I cannot get over being still alive. I could have hit this joker with my stick. I could have spit in his eye.

My element leader goes into a gentle bank back to the left. I begin to curse and rave. I am supposed to stick with him. The Luftwaffe has tried to take my life and I am up there doing gentle coordinated turns with my drop tanks still on.

The flight leader and his wingman chased this ME-410 many miles into the thickest cloud, and then went home, swearing and moaning.

The rest of the day was quiet. In the end we flew home and down through a hole in a cloud and landed. I was very kind to my airplane on the landing. The sky was blue and the sun was shining. Even the mud looked very beautiful. Everyone was very kind to me. Everyone was ashamed to know that the Luftwaffe had flown into our formation and flown out again.

The squadron CO took me off in the corner. "OK, you ought to be dead." He blew some reflective smoke in my face. "You got to look after your own tail."

They start telling you from the day you get in a PT-19. Look around.

"That's all, just keep your head out and look around," he said. "You'll know better after this."

I'll have to. I can't go wasting my luck on anymore 410s at six o'clock level.

Lt. Bert Stiles, APO 559

For a pilot who switched to fighters after more than 30 bomber missions, Lieutenant Stiles is doing all right.—Ed.

Cub Reporting

Dear Editor:

I am sending you herewith a picture of S/Sgt. Ted Bruin, ASN 32906724, tail-gunner with a B-17 outfit, who recently completed 83 missions and is being returned to the States for rehibernation. The sergeant

hopes to spend his 30 days at the American Museum of Natural History, then would like to be assigned on TD to AIR FORCE and write some stuff for *Shooting the Breeze*. Can you use him?

Pfc. Wallace McCauley, APO 41

Well, it'll bear investigating.—Ed.

Con-Job

Dear Editor:

. . . Since returning to the States from my tour of duty abroad, I happened to run

across your August, 1944, issue, and you can well imagine my pleasant surprise when I saw a full-page picture of my ship (leading a formation of B-24s over Ploesti on May 30, 1944) on the inside cover of your swell magazine . . .

The name of our ship was Con-Job and we flew it on all but three of our missions after having flown it across from our staging area.

Each of the crew completed 50 missions with nary a scratch in the total time of 99 days, which I believe is a few strokes below par for any theater of operations. At last reports, Con-Job had well over 60 missions to its credit and was still going strong, which is pretty good considering it was the only B-24G in our entire group—all the rest of the ships were either B-24Js or B-24Hs.

So, with more power to all the "flying box cars" (the best heavy bombardment ship in extensive use in all theaters of operations), and more power to your swell magazine, I am,

Lt. Ray R. Kravetz, Charleston, S. C.

Four-Engine Doghouse

Dear Editor:

. . . I see by the November issue that Lt. Z. M. Z. is bemoaning the fact that one of those four-engine doghouses, the B-17, broke into print with the amazing record of 29 consecutive missions. I'd like to join in the fracas from the point of view of a B dash 24 man.

I can't come anywhere near the lieutenant's story of 53 straight on the "Sweet Sue's Duke of Paducah," but to keep up the old rivalry between the Libs and Forts, here's a little poop. We had a Lib in my squadron in Italy which made 35 round trips in a row, and then on number 36 the "Fighting Mudcat" went down fighting.

That's the story, and from where I sit that's just about seven more consecutive missions than the famous B-17 went out on.

Lt. Haig Costikyan, Philadelphia, Pa.

Answers to Quiz on Page 42

1. (A) October 20, 1944
2. (C) B-29
3. (C) 5,000 miles
4. (D) Lt. Gen. George C. Kenney
5. (D) San Francisco, Calif.
6. (A) 2,200
7. (D) Invader
8. Personal Equipment Officer
9. (C) A service test aircraft
10. (C) P-38
11. (A) False. No such designation is recognized officially.
12. (A) True
13. (B) False
14. (B) False
15. (D) Twelve
16. (C) Saipan
17. (A) Saipan and Japan
18. (A) Five
19. (D) Thailand
20. (C) 82

first fight

BY LT. COL. JOHN D. LANDERS

as told to Lt. E. W. Yonick

The Colonel has 14 Japs and Jerries to his credit now, but this was his first scrap

I will never have a more hollow feeling in my stomach than I had that day over Darwin, Australia, early in 1942. By the time I had flown a P-40 up to Darwin, I had about ten hours of pursuit time. That was all the transition time I was to get, for on my second day at the field I went on ops.

In the afternoon of the second day we sat in our tent near the revetment hiding our ships. The phone jangled and an intelligence officer yelled "Scramble" at us.

Then I started what I believe was my most memorable flight. We all raced to our planes. There were 12 of us in all, three flights of four ships each. My 40 was no more than airborne when the engine started losing power.

I knew I should really go on back and land, but I was fresh out of flying school and just as eager as they come. Try as I would, however, I couldn't keep up with the other planes and they pulled away, leaving me a lonesome speck in the sky.

I climbed on up alone to 25,000 feet and began to circle about halfway between Darwin and Melville Island. I waited there for the enemy to come. They always came in on the same path.

In a matter of minutes I saw them coming in a few thousand feet below me, seven bombers and three escorting Zeros. Then I started having that sinking feeling in the pit of my stomach. It used to feel a little like that before a football game, but this was about a hundred times as bad. I circled above them and just didn't have the slightest idea of what to do or where to start. I couldn't decide how to attack.

Then I went down on them. I don't know just why; I never made a clean decision; it just seemed to be reflex more than anything else. I tore right into the middle of them and found a bomber dead in my sights. My machine gun fire riddled that joker, one of his engines took fire and the fuselage caught and it came apart.

By that time the escorting Zeros were after me. I must have looked like cold turkey to them and I almost was. Their fire punched holes in me from wings to tail and knocked my radio out. There was only one way of evading them, so I shoved the stick forward and just dived away.

After losing them, I wheeled around and climbed back to my waiting post, knowing they would come back out the same way they went in. In the distance over Darwin I could see my friends whittling them down. One by one, the Japs spun down on fire and out of control, until there were only three bombers left and no Zeros.

As the well-battered trio came under me I again attacked from astern. This time there was no hesitation; my "buck-fever" was gone.

I hurtled down and made a couple of passes at them. One went down immediately, but the other two hung together and finally crashed on the other side of the island. Those two were credited to the squadron as they had already been pretty well shot up before I got to them.

We had spotters on Melville and they confirmed all of the victories for us. Out of the 10 enemy aircraft that came in not one went back. We didn't lose a man. ☆

When blizzards close in the field, 100-hour inspections are performed in dispersal areas.

Despite snowstorm, this hatless mech works under canvas shelter on B-17's number 3 engine

Heater ducts feed underbelly of a C Hangars are used for heavy maintena

WINTERIZATION

Sub-zero cold and heavy snow no longer deter our aircraft

Winter at Ladd Field, Alaska, finds planes of the Air Transport Command well protected against snow and sub-zero temperature. Superb teams of huskies and malemutes are trained by AAF Search and Rescue Squadron to reach scenes of crashes in otherwise inaccessible regions.

With winter hard set upon the world's battlefronts, Air Force mechs are putting to good use winterization techniques developed in four years of sub-zero testing at Ladd Field, Alaska.

Winterization of aircraft that had to take-off from fields where the thermometer would often read 65° below zero, required careful examination of every instrument and procedure. The winterization program has been handled by the Cold Weather Testing Detachment of the AAF Proving Ground Command at Ladd Field, which has concerned itself with every type of military airplane from the helicopter to the B-29. Newcomers to the program are the jet-propelled planes which are streaking across Alaska's frozen skies with CWTD pilots at the controls. When the tests are completed, ground crews will know precisely how to care for the jet planes in sub-zero climate, and pilots will have complete advance information on how the jet reacts in wintry skies.

The photographs on these pages show operational activity at Ladd Field which handles the tremendous volume of traffic that moves along the Northwest Route of the Air Transport Command on its way to the USSR.

Looking like an Alaska sourdough's exaggerated description of a native mosquito, this P-51 on retractable skis can land on frozen lakes.

Armorers use sled to bring 100-pounders to B-24. CWTD bombers often prevent floods by blasting huge ice jams on rivers of Alaska.

SHOOTING THE BREEZE

GOT ANY GOOD STORIES? SEND 'EM IN!

Southwest Pacific. There had been an air raid the night the nurses arrived. So, typically, they were assembled the next morning and told what to do in such emergeneies. "Take cover when you hear the gong," said the medical officer in charge. "If you can't get to the shelter, throw yourself into a foxhole."

One of the prettier nurses raised her hand. "Please," she said solemnly, "how ean we tell a foxhole from a wolfhole?"

The medical officer chuckled, indulgently. "There are no wolfholes on this island," he said.

"Well," the nurse replied, "there certainly were last night." With which she exited, limping.

France. Where weighty words are concerned, no one will challenge the monopoly of OWI, especially since an episode that took place recently in the Mediterranean. An MAAF bomber carrying four tons of psychological propaganda pamphlets was bumbling over the Bay of Marseilles when somebody accidentally nudged the salvo lever. The entire load scored a direct hit on a German lighter and sank it. The crew claimed credit for the most spectacular typographical error of the war.

England. A group S-2 thought his boys were entirely too sleepy at briefings. One morning, in an attempt to catch them off guard, he inserted a trap into his remarks about making rendezvous with fighters. After a long dissertation on when and where they'd pick up the fighters, he casually remarked, "Our escort today will be B-29s." No one commented and after the briefing the aircrews shuffled out silently, obviously unaware of the remark. Later that day, the S-2 was surprised to receive a phone call from Wing Headquarters ordering him to London for a week's leave. Investigation revealed that the only one who heard his "trap" was the flight surgeon—who decided the S-2 was losing his grip from overwork.

India. A B-24 had to land at Dum Dum airport in Calcutta because of battle damage. When the plane was repaired the crew filled the bomb bays with cans of American beer and headed for home base. But while making their approach to the field, something went wrong with the bomb bay doors and all those lovely cans were scattered over the countryside.

The group adjutant was particularly upset and developed a recovery plan. He had word passed along to all the village headmen that "practice bombs" had been released by mistake and should be returned immediately "because of the danger of injury to civilians."

Quite a few cans were brought in triumphantly by natives as a result of this campaign, and the adjutant began to think of himself as a very cunning man. Finally, however, one old tribesman arrived carrying six neatly opened and empty beer cans. He handed them to the adjutant, salaamed, and said: "Me have removed explosive." Whereupon, with a loud burp, he held out his hand for a reward.

England. Calm but urgent was the voice.

"Coming in on one engine," it said.

The tower did the necessary. Runways were cleared. Crash crews were alerted. Other airplanes waiting to land were kept aloft.

The pilot with but one engine was cleared to land. He did—in a P-47.

USA. An angular woman of middle age visited one of our airbases and expressed her views freely on what she saw. She felt strongly about the cost of implements of war, and said so.

She accosted a second lieutenant who was wearing a parachute.

"Young man, what's that thing on your back?" she asked.

"A parachute, ma'am," he replied.

"Ever use it?"

"No ma'am, never used it yet."

"Humph, never used it," she said with considerable feeling. "Waste. That's what it is. Sheer unadulterated, inexcusable waste."

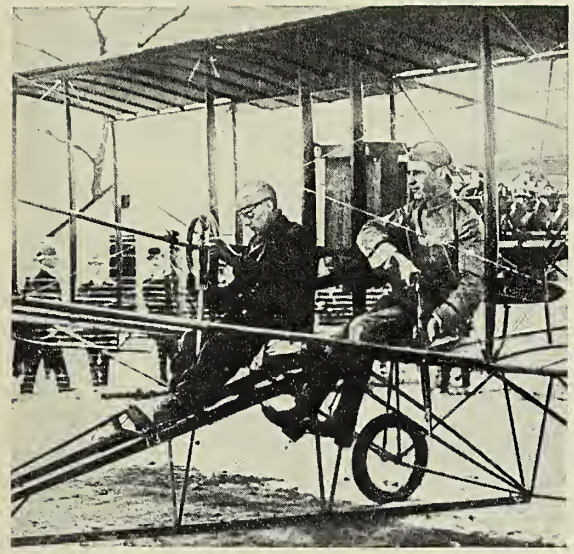
France. VHF in France had an important target and was trying to direct a fighter to it. The fighter pilot was obviously eager to oblige, but seemed a bit vague about the whole thing. After several unsuccessful attempts, VHF said pretty impatiently that the target shouldn't be hard to find, that it was four and a half miles due east of Cologne.

"East of where?" the pilot asked.

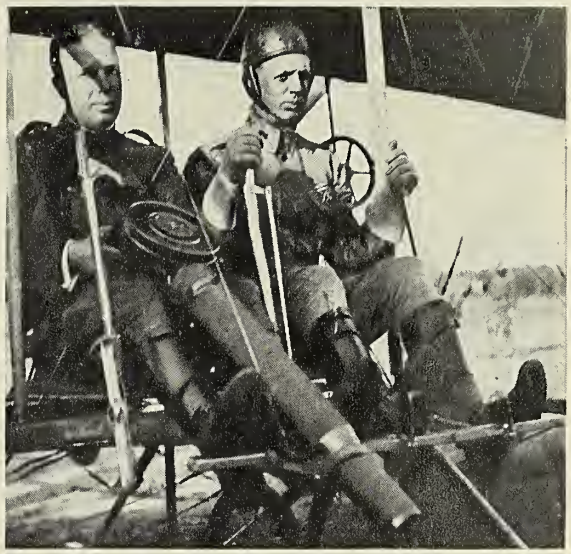
"East of Cologne."

After a brief silence, the pilot said, "Sorry, Bud. I'm in Italy." ☆

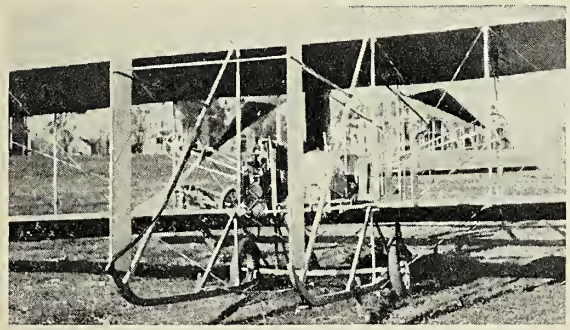
THE ALBUM



1910. Lt. Jacob E. Fickel, first nose gunner in history, sits ready on the firmg line. At 100 feet, Lt. Fickel (now Maj. Gen.) scored two bullseyes out of four tries.



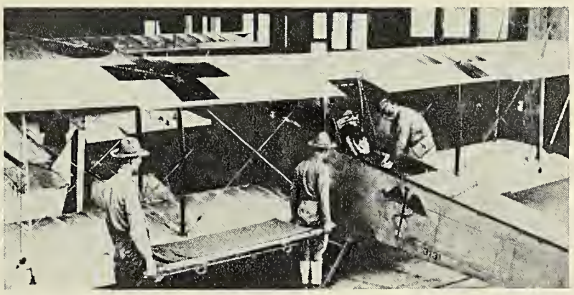
1912. The Lewis machine gun gets its first airing at the hands of Capt. C. Chandler whose side-kick seems a bit concerned over the possibility of landing on his head.



1912. With the machine gun a success, a radio was installed allowing the gunner to rat-tat-tat and dit-dot-dit at the same time. Antennas visible on front strut.

1914. The parachute blossomed forth as a practical life saver when Bert Perry swallowed hard, dived over the side of a Benoist plane. The result is shown above.

1918. Here's the Air Corps getting up steam in World War I. This Morone Rouliers is the first plane flown by U. S. pilots who numbered thirty-five, altogether.



1919. Air Evacuation got its start with this fancy arrangement that allowed the patient to rest comfortably in a section of the fuselage that had been uncovered.

learn BEFORE you leap!

- **Always pre-flight check your parachute.**
- **Insist on a fitted harness.**
- **Wear it whenever possible.**
- **Know how to bail out.**
- **Know how to land.**

Life-saving parachute technique can be learned in advance...and on the ground!
Read "Prepare to Bail Out," page 39.

AIR FORCE

THE OFFICIAL SERV[illegible] U. S. ARMY AIR FORCES ☆ FEBRUARY 1945

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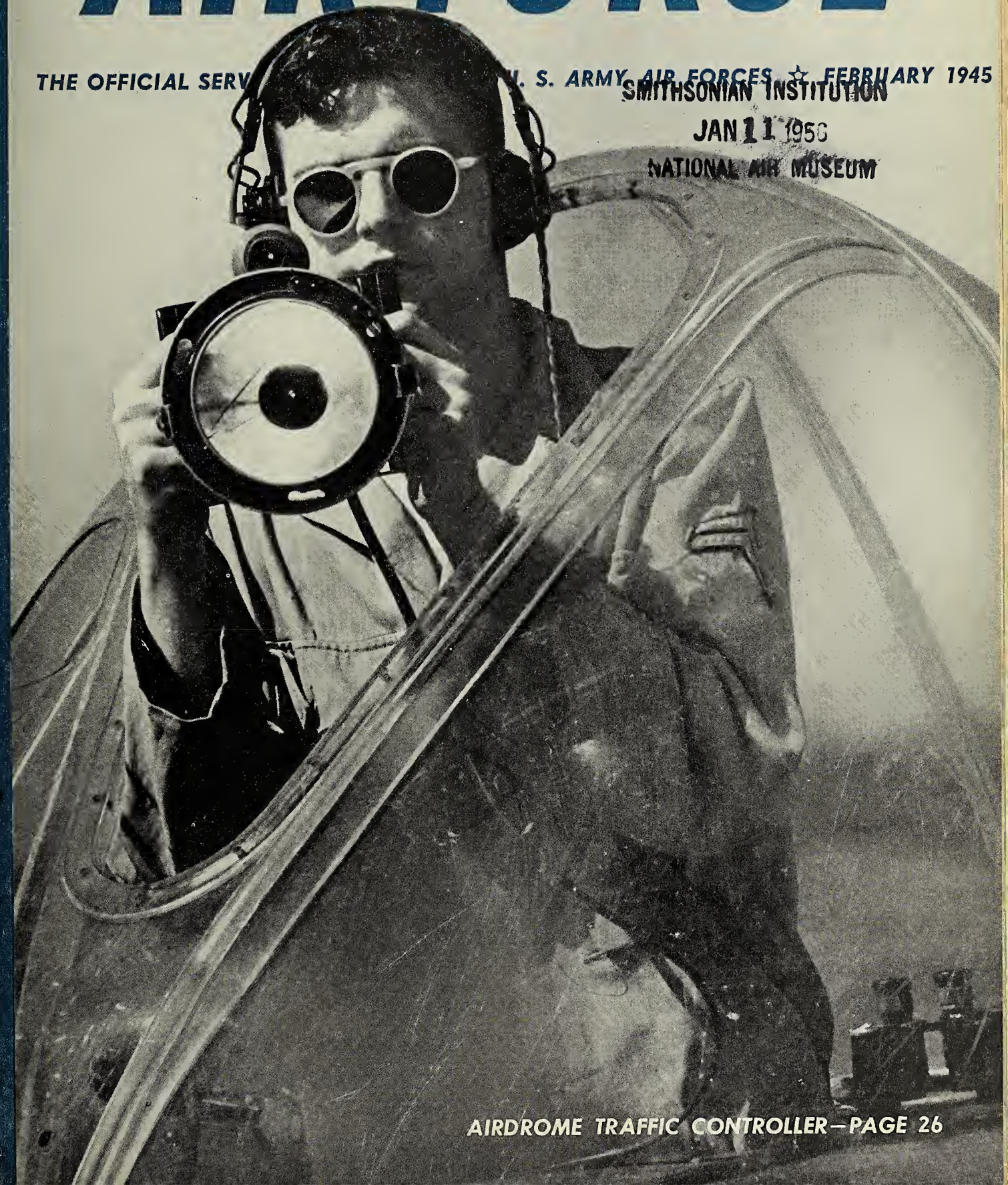

AIRDROME TRAFFIC CONTROLLER—PAGE 26

"Psst! . . . How much would M'sieu le General offer for a litre of hot water?"

"Copilot to pilot—how about a rendezvous at 5 o'clock?"

Highlights of Paris

by CAPT. WM. T. LENT

"It's for my sergeant. She calls it 'Eau de Snafu'!"

"Yeah, but you oughta see the ones on the Calhoun County Light & Power line back home!"

"To hell with your high school French. Stick to the GI guide book

Rendezvous

General Pershing's ASN

Dear Editor:

In the November Quiz, on Page 57, you have a question, number 17, regarding ASN No. 1. I would like to know if General John J. Pershing's is preceded by an 0, or if his entire ASN is merely a figure 1.

2nd Lt. Robert S. Petersen,
McAllen, Texas

His serial number is preceded by 0, indicating commissioned rank.—Ed.

The Time of D-Day

Dear Editor:

In the July and August issues of AIR FORCE there are articles on the liberation of France. They gave the starting time of the liberation as 0016, June 6, 1944. We have an argument in our company as to whether this time is official or not. . . .

Thanking you in advance for an answer to this question. . . .

Pfc. James Grubb, APO 667

The exact moment when the liberation of France began is, of course, a slippery thing to define. If you define it as the moment the first Allied soldier set foot on French soil as member of the liberating armies, then the time is just about 0016 as indicated. Our authority for this is the word of Lt. Col. Joel L. Crouch, CO of the first Troop Carrier Group to go in, who told our correspondent in Britain that he dropped his stick of paratroopers at that moment. If they took about one minute to drop the 600 feet or so, the time would have been 0017. There seems to be no official word on the subject; the communiques on D-day say only that the invasion began "early this morning."—Ed.

Minor Matter

Dear Editor:

. . . We've been thinking of writing you for some time, hoping all the time that you would correct the mistake in the color of the 4th AF insignia on the cover. But it has remained so I'm forced to tell you that the circle around the star in our insignia is white, not red.

Just a minor matter, but quite apparent to many of us . . .

S/Sgt. W. M. Carah, Chico, Calif.

Thanks, it's fixed. What sort of score do you make on How Sharp Are You?—Ed.

Recognition, Please

Dear Editor:

We have just finished reading your article in the October issue about the "Flight Nurse," and must compliment the author for writing this very good story. However, we would like to know one thing, and that is, what has happened to the surgical technician who accompanies the "Flight Nurse"? The boys in my outfit who have good reason to be interested, have read and reread the story, and failed to find a single mention of this lowly GI.

(Continued on Next Page)

Vol. 28 No. 2 February 1945

AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

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How Sharp are YOU?

A Photo test of Your Observational Accuracy

Wipe off your bifocals, get this photograph under a bright light, and give it 60 seconds of your undistracted attention. Then turn to page 29 and see how well you can do with 10 questions which you will find there. Score 10 for each correct answer. 100 is perfect. Out of 25 AAF officers and enlisted men tested, the low was 40, the high score was 100. The average was 65.

HOW SHARP ARE YOU? Turn to page 29

Rendezvous

(*Continued from Page 1*)

The surgical tech has passed through the same school, has taken the same courses which are required by the "Flight Nurse" and is classified as an assistant to the "Flight Nurse" on evacuation missions. At times the surgical tech is called out to go on these missions alone.

With all due credit and respect to the "Flight Nurse" who is doing a wonderful job, how about the guy who accompanies her on these missions?

T/3 John J. Kloch, New York, N. Y.

Dear Editor:

We wish to congratulate you on the wonderful build-up you gave our "Flight Nurses" in the October issue of AIR FORCE. They are doing a swell job, but how about giving the enlisted men that work with them a little consideration? We work side by side with these nurses and would appreciate at least a sentence of recognition in a few of the articles that are published on "Air Evacuation." At times it has been necessary for us to carry on separately and in many cases it is our combined efforts that bring our patients safely to their destination!

Six Technicians, APO 133

You did get honorable mention in the article "G.I. Airline" in the September issue of AIR FORCE. *But we agree you deserve more and will try to do something about it. —Ed.*

Hail Columbia

DESIRE SOURCE OF INFORMATION ON AND TRUE LOCATION OF "TOWER MOCK-UP FOR WATER JUMPS" CREDITED TO THIS BASE*** ON PAGE 46 OF DECEMBER ISSUE OF AIR FORCE. THERE IS NO KNOWLEDGE OF SUCH A MOCK-UP ON THIS BASE. A REQUEST HAS BEEN MADE BY HEADQUARTERS AIR TECHNICAL SERVICE COMMAND, WRIGHT FIELD, FOR INFORMATION ON THIS MOCK-UP. WILL YOU CHECK THIS AND FORWARD NECESSARY INFORMATION TO ANSWER THIS AND OTHER REQUESTS WHICH HAVE ARRIVED.

(SIGNED) STOUT, CO, GREENVILLE (S. C.) ARMY AIR BASE.

It was South Carolina, all right, but the Office of Flying Safety which submitted the item for publication says its report should have read "Columbia Army Air Base" not Greenville. OFS apologies to Greenville, hats off to Columbia.—Ed.

Whose Error?

Dear Editor:

Having always looked forward every month to a copy of AIR FORCE and regarding it as the most accurate aviation publication in existence, I was very shocked to find such an unpardonable error in aircraft identification as you made in your December, 1944, issue.

In the fourth paragraph of your article "Human Pick-up" you quote "On September 5, 1943, Lt. Alexis Doster was yanked from the ground, hurtled through the air and safely pulled into a Stinson Reliant"

unquote. The airplane shown in the article is beyond doubt a Noorduyn Norseman or C-64A (AAF designation). Correct me if I am wrong.

S/Sgt. Willard H. Hart, Tonopah, Nev.

Your aircraft recognition is good but your leap at conclusions falls short. The article said that the FIRST *pick-up was by a Stinson Reliant. The pick-up illustrated is a later experiment.—Ed.*

Hot Argument

Dear Editor:

In your August, 1944, edition of AIR FORCE, Page 30, you have a series of high-speed pictures showing a P-47 firing a rocket projectile. The caption states that the prop was feathered to permit making the photo-series. We know that P-47s are like angels to our bombers, namely B-17s, but we didn't know they could full feather their props. Please let me know if they can, or if it was a special plane with a feathering motor just for picture taking purposes. Our hut has a hot argument on the subject.

Cpl. Lester Eagle, APO 559

It was specially equipped with a full-feathering prop.—Ed.

Don't Throw In the Towel

Dear Editor:

I have a tip for flying radio operators which you may or may not be able to use. It has been a persistent hindrance to efficient communications for a long time. Here we go:

Novice flying radio operators sometimes forget the AACS facilities available to them. Destination and point of departure are the only stations they try to contact. If, for innumerable reasons (QRM, QRN, QRL, an inattentive operator, etc.), they fail to get their message through, the fledglings either throw in the towel, or keep pounding away vainly, while their important message is delayed.

Take a look at the AACS facilities charts, fellers! All AACS stations are at your service. Especially intervening stations along your route. If you don't get one, call an other, and he will QSP. If your attempts at contact are futile and a strange AACS station offers to QSP, don't hesitate; give him your message. If your station is QSA 1, and an intermediate station is QSA 4 or 5, let him QSP.

AACS will get your message to its destination in short order, using varied radio facilities. Let us help you flying men. That's our primary purpose for existence.

Sgt. Saul Rafalowitz, APO 675

Women and Wings

Dear Editor:

. . . I am not a member of an aircrew and therefore do not wear wings. I would like to know whether my wife or mother is entitled to wear the wings of the National Association of Air Forces Women which was mentioned in the November issue. . . .

Sgt. Erwin Gardiner, New Orleans, La.

Yes. The wings of the National Associa-

(Continued on Page 42)

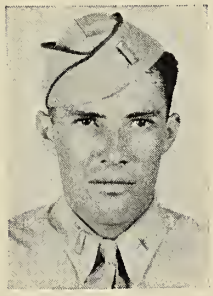
In This Issue

The man on the cover this month is not from Mars, he's from Saginaw, Mich. He is Cpl. William H. Barnes, Jr., formerly a bank clerk in Saginaw and now an AAF Airdrome Traffic Controller in England where he added a course in an RAF Traffic Control school to his American training. From the plexiglas dome, which was salvaged from a Fortress, he has an unobstructed view of 360 degrees of horizon, and, of course, radio communication with planes on the ground and in the air.

The photograph was taken by Capt. Robert Isear, chief of the photo section of USSTAF's PRO office. He escapes from London occasionally and usually returns from field trips with some superb shots. The cover on the Cross Country section this month (Page 21) is another fine sample of his work.

One of the great untold stories of the war to date is what happened to the thousands of Allied airmen who parachuted into enemy-held territory. Now that most of France and Belgium has been liberated, some of the stories can be told. Our correspondent in the Mediterranean area, Capt. Lawrence P. Bachmann, offers you on Page 4 one of the first narratives of its kind to be passed by the censors. He calls it, for obvious reasons, "The Blister Club," and when you've finished it you'll understand why we've given it the lead spot in this issue.

One of the oddest reports we've had in a long time comes from Maj. Charles Frazer, just returned from a tour of duty as our correspondent in the ETO. He says he has it on good authority that some of our C-47s extensively used in glider snatching and towing operations have stretched a good ten inches. Checking this yarn, which also stretches our credulity, is practically our next order of business. At the moment, it sounds more like a good item for "Shooting the Breeze."



We are very sorry to report that Lt. Bert Stiles, 8th Air Force fighter pilot whose article "Situation Normal . . ." appears on Page 19, has been reported missing in action since November 26. Those who remember his "Portrait of a Guy Thinking About An Island" in our November issue, or even his amusing letter in Rendezvous last month, will probably agree with us that besides being a versatile flyer (he finished a tour in Fortresses before switching to Mustangs) he is also one of the best writers in the AAF. He has a unique faculty for giving the earth-bound reader a sense of participation in air combat, and he has a wonderful ear for words. We sincerely hope that the next news we have of him will be good news.

On Pages 32 and 33 you will find some combat sketches by Capt. Raymond Creekmore, shown here looking remarkably cheerful in a photo taken just before the first Tokyo B-29 strike. A note from Creekmore informs us that he has taken another long hop in quest of battle scenes, this time in a Superfort that navigated a fighter-mission to Iwo Jima. According to Ray, it was an exciting trip with the P-38s going in on the deck, strafing ships, shooting up shore installations, chasing one Jap plane 25 miles out to sea before shooting it down. There was some defensive fire, and while the Superfort was not hit, one of the P-38s came limping out with considerable battle damage. The big bomber took the peashooter almost literally under its wing and shepherded it home across hundreds of miles of open sea.

Maj. David Weld who wrote "The Care and Briefing of Fighter Pilots" on Page 9, is a non-rated young officer who wears the Legion of Merit, the Soldier's Medal, the Air Medal with cluster, and his Unit Citation with two clusters—all acquired since he left Wall Street back in 1942. He was home on a 30-day furlough when we approached him with the suggestion that he try an article on S-2 work for us. The job kept him in this country a few days longer after the furlough expired, but his CO in the Mediterranean was very reasonable about lending him to us on TD. Weld didn't object either; he was able to spend Christmas with his wife and three small children.

Maj. Herb Johansen, our correspondent in the Philippines who wrote "The Fighting 13th" on Page 16 this month, is working on a story of the excitement and confusion attendant on the Japs' paratroop attack on Leyte. He says that at the San Pablo strip the Japs acted as if they were drunk or had been drugged. They were singing, yelling, and three of them were playing musical instruments—a jew's-harp, a harmonica and a small horn (probably identifying or rallying signals) and they shouted crazily, "Hello, hello, where are your machine guns?" Their work of destruction had neither rhyme nor reason . . . but we'll let him tell his own story in a forthcoming issue. ☆

The Blister Club

Shot down into enemy-held territory, many of our airmen have walked through incredible hardship and danger to safety. Here are the stories of some charter members of the Blister Club who were recently repatriated from Switzerland

Thirteen members of the Blister Club, on their way home from Switzerland, take time out for a stretch and a cheer as they cross the border.

BY CAPT. LAWRENCE P. BACHMANN

AIR FORCE *Overseas Staff*

Clang, clang, clang went the trolley—which was packed with cheering, half-hysterical Americans on their way home. It slowed down as it neared the Swiss-French border and the Americans jumped out doors and windows before it stopped rolling. Waiting for them at the barbed wire that marked the frontier were an American brigadier general, many high-ranking Swiss, and a covey of U. S. colonels.

The whistling and cheering died down—the American uniforms seemed to remind our mufti-garbed flyers that they were still in the Army. A tall rangy captain, pilot of a B-17 that had been shot down months before, called them to attention and they fell in in double line. He called roll, about-faced, saluted the general, Brig. Gen. R. B. Legge, and reported that his escapees were all present and accounted for.

General Legge, in turn, checked the roll with the Swiss representatives and there followed a great deal of muttering and head-wagging—there were 60 Americans but the rolls listed only 59. While the Swiss counted and recounted and checked through papers, the U. S. colonels on the French side of the border grew increasingly nervous.

They'd come a long way to arrange for the release of the AAF aircrew members and no one wanted to see negotiations break down now. The Swiss had amply demonstrated that they had no intention of risking their neutrality—which many Swiss consider their most important national industry—and never would have consented to the release of any Americans were they not sure it was completely legal and super-neutral.

The Swiss scrupulously observe those articles of interna-

tional law which provide that belligerents who land in neutral territory will be interned for the duration. Thus all aircrew members who brought their crippled planes down on Swiss soil—or parachuted onto it—still are being held and probably will be until the war in Europe is officially over.

However, men who escaped from the enemy and sought safety in Switzerland — who walked unarmed into the country—are considered escapees rather than internees. According to a law which probably goes back to medieval times, escapees are entitled to sanctuary and are treated like tourists—perfectly free to leave. This was purely theoretical until we had liberated some of France touching on Switzerland and could effect the rescue of the escapees. The 60 airmen standing at attention on the French border were the first escapees thus released from Switzerland in this war.

As soon as Lt. Gen. Alex M. Patch's ground troops had reached the Swiss border international negotiations were begun through General Legge, our Military Attaché in Switzerland. He asked Lt. Gen. Ira C. Eaker, commanding general of MAAF, to send a party up to the Swiss border to arrange the details and take care of the men. Thus on our side of the border there was an organization of the 15th Air Force called ACRU—Air Crew Recovery Unit—which boasted a 2½-ton truck, a bus, and some bilingual officers.

Their local negotiations in the Haute-Savoie section of France had been conducted through the head of the FFI in the area—a semi-legendary individual always spoken of as "Niveau." He turned out to be an American officer, raised in France, who had been dropped by parachute in Haute-Savoie in June, 1944. A round-faced man in his late twenties, he alternated between American Army uniform and the clothes of a typical Frenchman—and by his contacts and knowledge materially helped ACRU make its preparations.

The preparations had seemed foolproof—

Happy Blister Clubbers, awaiting transportation to the U. S., display a varied collection of German souvenirs they obtained from prisoners.

but there were the Swiss looking unhappy and rechecking the roll. Finally it was found that the error was purely clerical; the missing name was added to the list, and the men started passing through customs. As each had only one small bag the examination went quickly and soon they were all in France.

En route to the small French town where ACRU and Niveau had arranged quarters for them, they were given some K rations as a snack. These they devoured as though they were seven-course turkey dinners, relished out of nostalgia rather than hunger.

For they had been well taken care of in Switzerland. Put up at some of the best hotels in world-famous resorts, they had the freedom of the villages, learned to ski, ate well, received full pay—and grew unbearably bored of listening to radio reports of the war and having no part in it. Some of the boys got so angry at Swiss prices that they took to making their own insignia rather than pay $1.75 for a single lieutenant's bar or $7.00 for a pair of pilot's wings. This was an important item because most of them had been helped into Switzerland by members of the underground of Belgium, Holland or France who had collected all available AAF insignia as souvenirs.

When they were greeted by ACRU most of them wore civilian clothes of every shape and form. Some were as smart as Bond Street Beau Brummels; others looked like Mickey Rooney characters, but all had one thing in common—the silver boot insignia of the Blister Club proudly worn on their lapels or their neckties.

This strange looking but happy crew was quartered for the night in a little town near the Swiss border and Intelligence officers went to work interrogating them about their escapes from enemy territory:

An 8th Air Force lieutenant, copilot of a B-17, was on the December 30, 1943, raid on Ludwigshaven. It was his fourth mission. The Luftwaffe was up in force that day and one of the fighters came in close enough to knock out one of his engines. The plane lost speed, fell out of formation and German fighters closed in—knocking out another engine. The pilot dove through clouds to shake them off, diving from 23,000 to 1,000 feet, and broke out right over a German airdrome which welcomed them with a hail of light flak. The tail gunner was badly hurt and could not bail out, so they decided to crash land near the Belgian border.

The pilot ordered the crew to split up into pairs and make for the Swiss border while he remained with the wounded tail gunner. Some months later the copilot and his companion, a waist gunner, learned that the wounded man died 14 days later. The pilot left only after burying his man in a French cemetery. Later, when their only mail came from home, they learned that the pilot and the rest of the crew were safe in Ameriea.

The lieutenant and the sergeant, though dressed in fur-lined, leather flying clothes, walked through occupied territory unquestioned for three days. Finally they reached a farm where the French owner gave them some clothing, although he could speak no English and they no French. After that they walked for an additional two days and still saw no signs of the enemy. They were exhausted and their feet were blistered when a French family, where they stopped to ask for water, put them up for two days.

Only an hour after they left this family they were stopped by a French policeman who demanded their papers. Believing it was all up, they confessed to being Americans and the policeman shepherded them toward town—but turned them into a small house on the outskirts where lived a member of the underground. The French were very worried for

(*Continued on Page 56*)

Back Home — and Then What?

The latest word on rotation and what happens to the 18,000 AAF returnees coming home each month

BY MAJ. BENJAMIN J. GRANT, JR.

AIR FORCE *Staff*

If you are overseas, if you have been overseas, or if you have any prospect of going overseas in this war, this article is for you. It will undertake to answer three important questions:

1. What rotation is provided for AAF personnel overseas?
2. Are men who have completed one tour of duty overseas likely to be sent overseas again?
3. What is done with returnees in the United States?

The information contained in this article amounts to a roundup of policies established in Headquarters AAF, the Personnel Distribution Command, the Training Command, the continental Air Forces, and other AAF activities involved in the rotation and assignment of personnel—policies which are tempered by military necessity and which, so far as they can be spelled out at this time, provide the best answers to these questions.

Take question No. 1. There is one answer for aircrew personnel and another for ground personnel.

The AAF produces and delivers enough new aircrews so that overseas air commanders are able to maintain necessary crew strength and still send some home. Sometimes commanders have been able to estimate in terms of the number of missions when crews can be released. Sometimes it is by approximate dates. But in any case, there is rotation only when enough replacements are on hand so that veterans can leave.

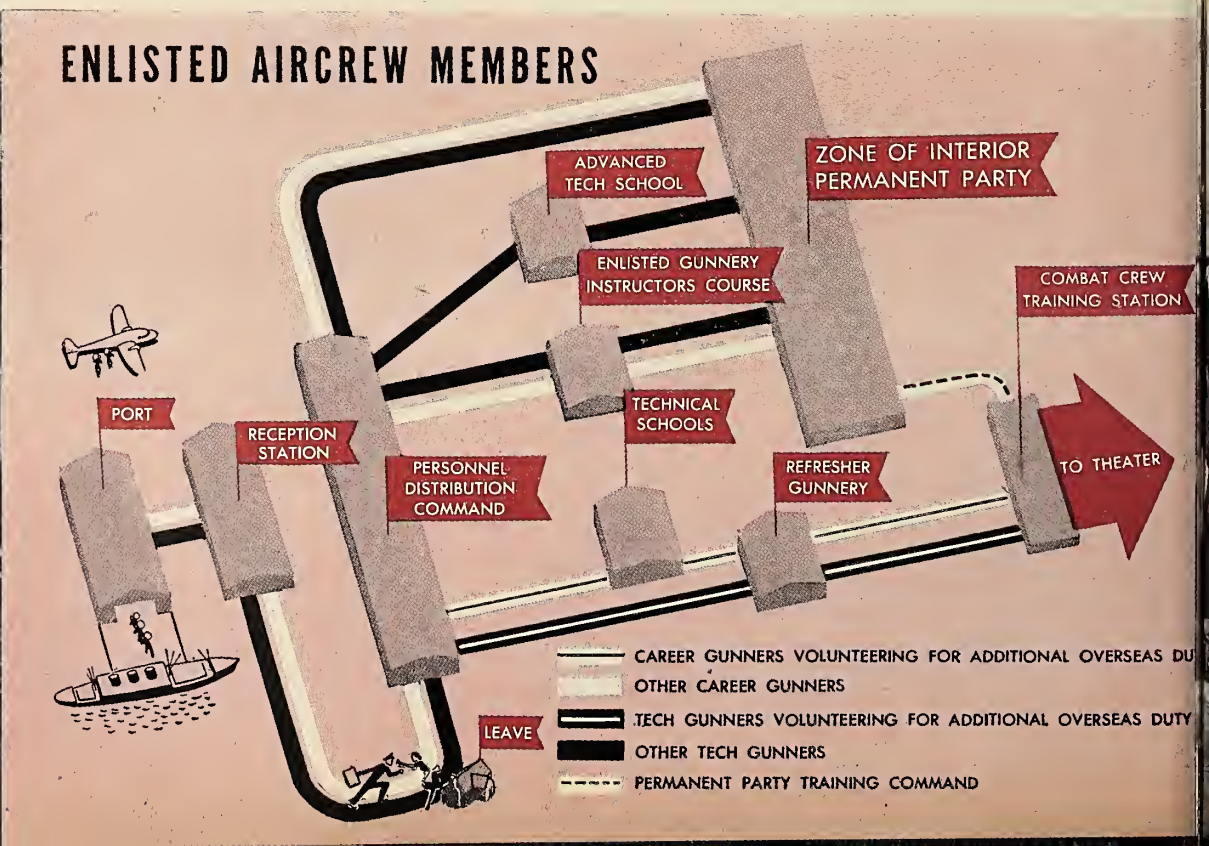
So far as ground personnel is concerned, there is little rotation. The greatest difficulty is shortage of manpower. A man cannot be returned from the theater unless a replacement for him has been sent over from the United States. Availability of outbound shipping space also is a factor, since priority goes to essential supplies and equipment and to the personnel necessary for loss replacements. That leaves but little room aboard our ships for rotation replacements. AAF ground personnel must take their chances along with all other War Department personnel.

From some theaters, the rotation of ground personnel is one percent per month. From others, it is one-half of one percent. From the United Kingdom, there is no rotation of ground personnel at all. Frankly, the odds are against returning any large numbers of ground personnel by rotation before the war ends.

About second tours overseas. Obviously, this question cannot be answered flatly yes or no. It depends, like everything else, on how the war goes. It depends upon the special skills of individuals and how much these special skills are needed in Europe or Asia or wherever else AAF personnel are stationed in this war.

But on this much, AAF policy is well settled: Combat veterans are sent overseas for second tours only when military conditions require it. When it becomes necessary to order personnel out for second tours of duty overseas, all those physically and professionally qualified will be considered available. Time back in the U. S. will be a factor in selection.

What about the aircrew member, officer or enlisted, returned on the regular rotation basis, who decides he would like to volunteer for another tour overseas? He may do so,



either at the redistribution station or later at the station of his continental assignment. His experience is welcomed by the theater.

Generally speaking, volunteers will be returned to the theater in jobs involving the same skills as the jobs they held on their previous tours. However, some opportunities are provided for training in new specialties.

What is done with returnees in the United States?

The answer to this third question is more complicated. It will be necessary to state some general rules which apply to all returnees. Then we shall discuss them by groups—enlisted aircrew members, flying officers, ground personnel.

For purposes of this discussion we shall not include those who have been returned for physical reasons. The care they are given has been described before in AIR FORCE. It is sufficient to point out that if and when they are fully able to do so, they join the regular personnel flow which will be described hereafter.

Because of the variety of specialists being returned, it is impossible here to explain in detail the assignment of each type of returnee. Detailed information is given to individuals at redistribution stations. The personnel flow for aircrew members outlined here applies only to individuals physically qualified for further flying duty. Personnel not physically qualified for further flying duty will be assigned to air forces' and commands' permanent parties either for duty based on individual skills and experience or training for new jobs along with returned ground personnel.

For the first five weeks, the program is generally the same for all returnees. To start with, all are given 21 days' leave, at the end of which they report to redistribution stations for approximately two weeks. There are four of these stations: Atlantic City, Miami, Santa Monica, and Santa Ana.

Not many men are being sent to officer candidate schools now, but for the few who are selected, preference is given to qualified returnees from overseas.

This is a good place to scotch a rumor that has been circulated recently about new duty stations. No matter what anybody has told you or how straight they claimed to have got it, it is not true that all returnees are assigned to permanent duty stations close to their homes. Think about it for a moment and you will realize that this would be a physical impossibility. The U. S. area of greatest population is the northeast. The greatest concentration of AAF stations is in the south and west. It would be futile, therefore, to undertake to match up individuals and home areas. Incidentally, housing for dependents in many of these areas is as easy to find as a steam heated foxhole.

ENLISTED AIRCREW MEMBERS

The enlisted combat crew returnee who decides he wants to have another crack at the enemy normally goes back in the same job he had on his first tour. Because he may have his second tour in some other theater, he gets a period of refresher training designed to give him the lessons which the AAF has learned in all theaters. For the career gunner, there is an opportunity for technical training so that on the next trip out he goes as a technician gunner. As far as possible, he is given some choice about the kind of plane he does his shooting from.

A volunteer for another tour can expect to be in the U. S. about six months before going overseas again.

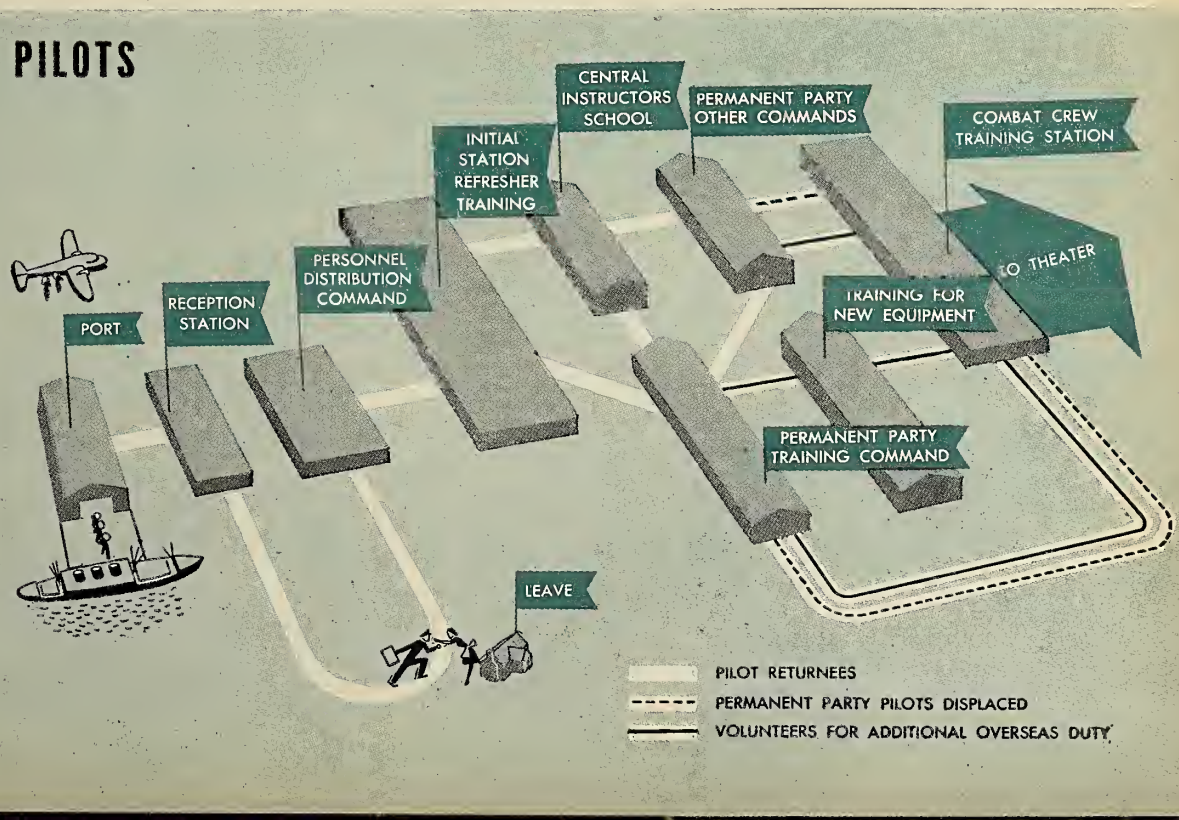
For returnees who want to stay in this country, the situation is different. Those who become air operating gunnery instructors or who are assigned as flying crew chiefs continue on flying status. These are few. The great majority will get non-flying jobs and will be required to give up their flying pay. The ones selected to be instructors take the enlisted gunnery instructors course. Some receive training in their basic skills and get ground assignments requiring those skills.

The number of individuals coming into the AAF now is only enough to replace our actual losses. Thus, if we are to have rotation, many of those who come home must fill the jobs of the AAF ground men who have been sent to gunnery training so that they in turn could replace men overseas. Thus, a returnee may get a desk job or a housekeeping job or whatever it takes to fill the place of a man who is on his way to combat.

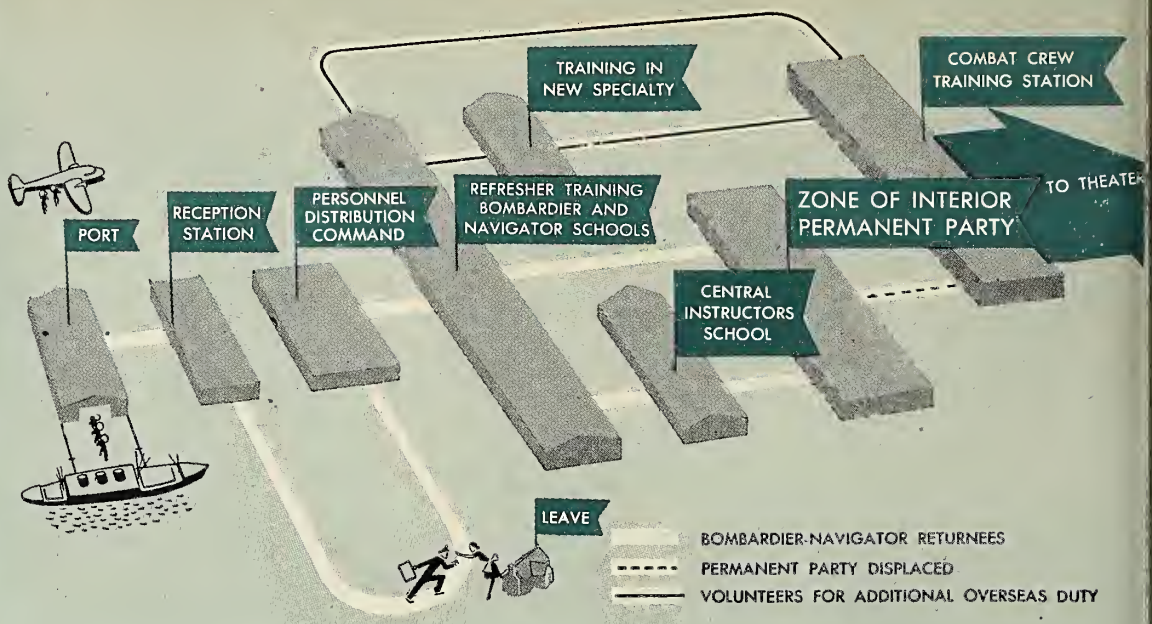
FLYING OFFICERS

Except for those who are given special assignments directly from redistribution stations—and there aren't many such assignments—returned rated officers are sent to the Training Command for refresher and perhaps other training.

Some pilot officers are sent to Central Instructors School



NAVIGATORS AND BOMBARDIERS



for training to become instructors. Others are absorbed in administrative duties or technical permanent party positions or assigned to special flying duties. Copilots are given an opportunity for upgrading to first pilots.

All bombardiers and navigators receive refresher training except those who volunteer for and are found qualified for pilot training. Some are selected for instructor school training after the refresher course, and others are given an opportunity for specialized training in the radar observer bombardment program. The rest are assigned to permanent party administrative or technical duties.

Generally, rated officers who want further overseas duty will be returned in the same skills they had during previous overseas service. In all cases, however, the volunteer for a second tour receives refresher training in his specialty before taking approximately three months of training in the combat crew training system.

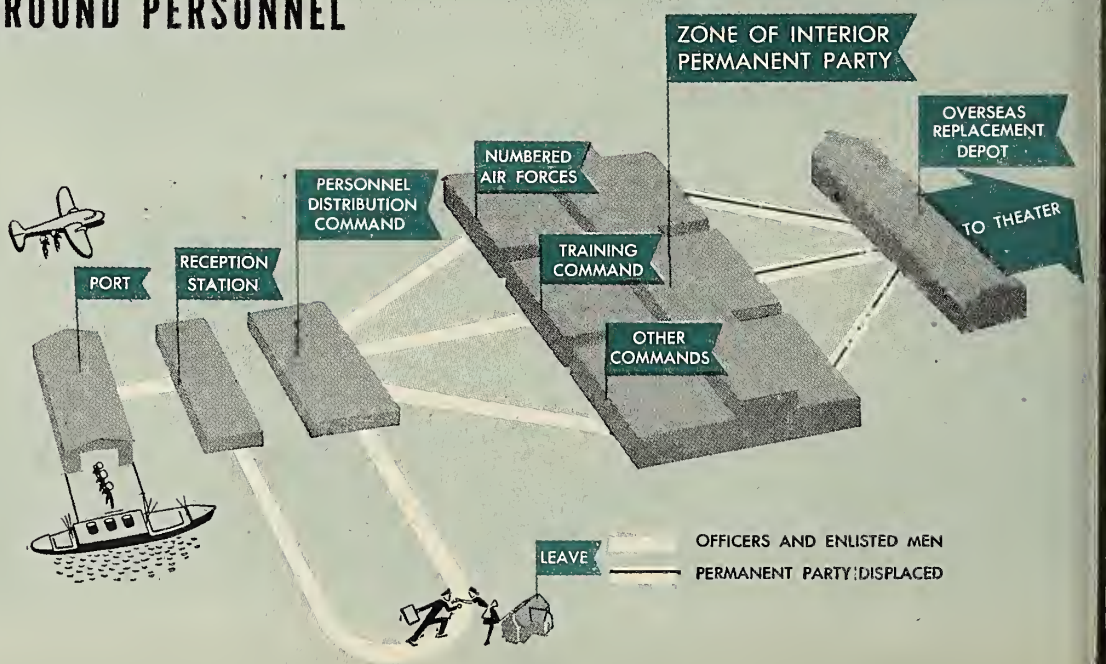
GROUND PERSONNEL

Generally speaking, the program for non-rated officers and non-rated enlisted men is the same. From the redistribution station, they go direct to new assignments in permanent parties of domestic air forces and commands, releasing others for overseas duty.

The rate of return of AAF personnel from overseas has reached 18,000 a month, and it will increase. But no matter how great the load becomes, the AAF intends to continue processing returnees as individuals, not as mere names from the punch cards. On that foundation, squared with the needs of war, AAF personnel policies are established.

This article has stated policies as they exist today. It is a developing situation. As requirements change, so must AAF personnel policies change. AIR FORCE will report important developments. ☆

GROUND PERSONNEL



The Care and Briefing of Fighter Pilots

A Group Intelligence Officer is necessarily a man of many talents. Here are some words of wisdom based on two years in the Mediterranean area

BY MAJ. DAVID WELD

S-2, 82nd Fighter Group, 15th Air Force

Before joining our outfit to go overseas, we S-2s—fresh out of Harrisburg—had some pretty odd ideas as to what our work would be like. Some of us anticipated an existence devoted primarily to aircraft recognition, airdrome defense plans, outwitting enemy agents, and occasional spells as mess officer. To most of us greenhorns, a "bandit" was just a native guerrilla, and a "split-S" something you'd find in alphabet soup.

What we definitely did not expect was to become a cross between a scoutmaster, batman, all-night clerk, father confessor, and master of ceremonies. We found all these things were required of us; discovered that the job of S-2 in a long range fighter group today is a profession that takes at least four months of combat operations to learn. But there is nothing mysterious about it and anybody can learn it, Harrisburg-trained or not.

A fighter S-2 is all things to his men. He wakes up his pilots before the mission, sees that they get to briefing, runs them out to their planes in his jeep, sweats them out while they're in the air, and interrogates them on return. He drives his boys to the Red Cross Club or maybe takes them swimming on stand-down days. He helps the new pilots feel at home and cooperates with the flight surgeons in spotting pilots who should be grounded. He keeps the squadron diary, usually censors the whole outfit's mail, takes his trick as officer of the day—getting good and lost on moonless nights while inspecting the guard—and provides a continuity of procedure as commanding officers and pilots are replaced by new ones.

It is probably an advantage for an S-2 to have flown a little in combat—enough so that he has some idea what enemy fighters and flak look like. But flying as an observer is not always a profitable venture. Back in the autumn of 1943, Capt. Clarence H. (Pop) Corning, squadron S-2 and ardent devotee of the classics, asked the CO's permission to ride in a B-25 as observer on a P-38 escorted mission over Athens. "Pop," said Lt. Col. George M. MacNicol in his dry fashion, "that's a hell of a way to get culture." It was. Pop is now helping sustain the morale in Stalagluft 3.

The job of S-2 varies somewhat with each fighter group. In our P-38 group—the 82nd of the 15th Air Force, the S-2 among other things writes up all citations for awards and decorations, keeps historical records, takes care of training pilots in air-sea rescue, P/W conduct, and aircraft recognition. The primary distinction between squadron and group S-2s is that the former live on closer terms with the pilots while the latter spend more of their time running the office and battling with the mission orders which stream in all night long.

Enlisted men in the completely centralized S-2 office do the basic work. They keep the target information section up to date, maintain the situation maps, neatly file the thousands of maps required for operating any place in the theater, prepare maps for the pilots on missions, type up all reports, write all PRO material and keep the many records up to date.

The primary and most exacting task of an S-2 does not lie, as many think, in interrogation and reporting the results of each mission. It lies in the role he plays in the briefing

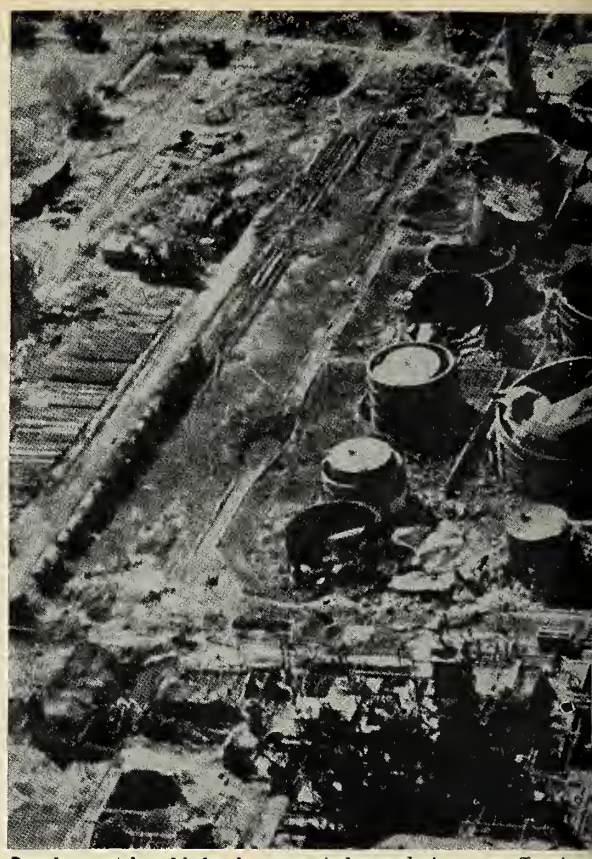
and in his share in the planning of the operation itself.

In the case of the 82nd we started from zero and grew gradually into this job. In the beginning our pilots were escorting medium bombers over Tunisian ground targets or on interminable sea sweeps after enemy shipping. There was no separate briefing for the "peashooter" pilots who simply listened in to the bomber briefing from the back of the dark, crowded French warehouse at Telergma. The principal S-2 headache in those days was unravelling the stories of the pilots' repeated battles with the Luftwaffe.

Independent briefing of the group's pilots did not materialize until the unit finally moved from Telergma's muddy airdrome to a separate base at nearby Berteaux. Here for a while our work continued to be straight escort missions where in a pinch the pilots can make out with a super-condensed briefing giving but five items: time, place, and altitude of rendezvous; type of bomber to be escorted, and target. Of course we always gave data on flak, enemy fighters, etc., but in this type of work an omission ordinarily would not have been fatal.

From doing nothing but escort work, we finally graduated to occasional independent fighter missions in April, 1943—and briefing became proportionately more complicated. First such mission was a fighter interception of the Axis aerial transport fleets bringing vital supplies to the beleaguered Germans in Tunisia. When the traffic had attained attractive proportions, the 82nd was given the first interception job off Cap Bon. In a couple of weeks Allied fighters obliterated this vital aerial line of supplies. The 82nd alone destroyed over sixty aircraft in four missions. Our pilots paid tribute to the luckless German pilots who kept their blazing, oil-laden JU-52s flying on in tight formation until they finally blew up or went out of control.

Intensive study of photographs added its burden to the S-2's life when the group received its first dive-bombing assignments in the spring of 1943. The aerial conquest of Pantalleria gave the S-2s little chance to sleep, with as many as 10 missions a day being dispatched to dive-bomb the Island's coastal gun positions. Aided by a magnificent eight-foot tall photo mosaic of the island of Pantalleria and numerous photographs of the various targets, intelligence officers made certain that each pilot was thoroughly familiar with the appearance and layout of his prospective target.



Bomb-carrying Lightnings carried out their most effective

First actual use of contour maps confronted the S-2s when the group's P-38s undertook simultaneously to dive-bomb the Pantalleria airdrome and skip-bomb its underground hangars. Our Lightnings came in from the west on the deck, roared across the airfield, and released their bombs in front of the wide doors of the underground hangars. Several hits were made on and near the hangars, which were literally dug into the steep hillside.

A new task came to the group's intelligence officers with the invasion of Sicily. We wanted the pilots to learn by heart some 70-odd words and phrases peculiar to British radio lingo. Such knowledge was essential for communication between the P-38s and the controller of the Sicily-bound convoys which the Lightnings were to protect by an elaborate and complex system of patrolling.

Several months later another type of patrol was undertaken by the P-38s—this time over the Salerno beachhead. Here the Lightnings operated under the direction of a ground radio controller who directed them to intercept enemy aircraft or dive-bomb special ground targets. This

"Droop-Snoot" is what the boys call this P-38 which has given up its armament for a plexiglas nose, Norden bombsight, and bombardier. P-38 bombardiers are recruited from heavy bomb groups.

iis section of the Romana Americana Oil Refinery at Ploesti, Romania.

Here are P-38s ready to go on the war path. P-38 in top photo carries belly tank and 1,000 lb. bomb. These planes hit refinery shown at left. Bottom P-38 packs six 500-pounders, used for high-level or dive-bombing.

patrol work was new and ticklish stuff to many of the pilots.

On August 25, 1943, 140 P-38s of the 1st, 14th, and 82nd Fighter Groups executed the first mass long-range, low-level strafing mission of the war against the Foggia network of airdromes. S-2 spent more sleepless nights preparing for the attaek which was led from Tunisian bases by the late Lt. Col. George M. MacNicol wearing his ridiculous lueky Seotch plaid golfing eap, whieh he was superstitiously eareful to take on every mission—except his last airplane ride. This raid erippled the strong German bomber forees around Foggia at a vital time before the Salerno landing.

Not until the end of 1943 did our group switch from eseorting medium bombers to working with the heavies, although the other two P-38 groups had been doing the latter job for some time. The ehange involved no real new problems for the S-2, exeept that the pilots were unhappy about having to fly at the higher altitude, because of less satisfactory plane performanee, eolder temperatures, and the necessity for oxygen.

As the 15th Air Force doubled and quadrupled in size with B-24 groups pouring over from the States, the S-2 briefing officer found it increasingly necessary to emphasize every possible point which would help the pilots effect a satisfactory rendezvous with the proper bomb groups. This was not an easy task in bad weather with bombers seattered all over the sky. But it was all-important, for a formation of heavies without its assigned escort would often find enemy fighters standing off and slinging rockets in at them in most unpleasant fashion.

When in the summer of 1944 we started to use our fighters as high-level preeision bombers the S-2s were confronted in miniature with all the problems of a heavy bomb group: approaeh, target reeognition, ete. This innovation just about eompleted the sueeession of tasks assigned to the versatile P-38.

No small part of an S-2's job eonsists of assisting his CO in planning the mission, especially in the ease of a low-level strafing attack on an enemy airdrome. Here the eourse selected must avoid all known or suspeeted enemy gun positions. The route must have good eheek points and turning points, since any sharp change on the deek at the last minute is impossible. The final run in to the target must be ehosen with great eare to offer enemy guns minimum shots and maximum deflection. On his photos the S-2 must indicate the position of every enemy aireraft and every gun, also he must show every high obstaele such as high tension wires and any ammunition dump. Fighter pilots are understandably sensitive about running into the former or shooting into the latter.

On a mission against a fixed target, the S-2 cannot spend too mueh time poring over his photographs with stereoseope and magnifying glass, as well as studying his small

(Continued on Page 54)

THIS IS YOUR ENEMY

. . . it's your life or his

Family Argument. Kodo-ha, the radical party in the Japanese Army, is devoted to the uncompromising armed expression of the "Japanese Spirit" both at home and abroad. It is opposed to Tosei-ha, the more conservative group which also advocates widespread expansion abroad but favors a less severe policy of discipline, control and cooperation at home. To the group of extremists belong such fire-eating Japanese as Tojo, Itagaki and Mazaki, as well as numerous hot-blooded younger officers. Tosei-ha claims Koiso, Sugiyama, Ugaki and the majority of members of the present Japanese government.

From 1931 to 1944, the Japanese were generally under the influence of Kodo-ha. During the months immediately after Pearl Harbor, that influence was unchallenged. As late as last February, the Kodo-ha reign was at its height. That month Sugiyama lost his post as chief of staff, and Tojo added that title to his honors of war. The active power of Kodo-ha ended in July, 1944, when Tojo's government fell and gave place to Koiso. The new ministry included Sugiyama as Minister of War.

"Wounded Japs have thrown hand grenades at medical personnel . . ."

When Kodo-ha was last restricted by the milder methods of Tosei-ha, in 1935, the hot-bloods first expressed their disapproval in random mutinies. A little later, organized assassination was chosen to upset the army leaders and politicians which Kodo-ha considered too conservative. That the radicals will try any such methods in 1945 is not very likely. The two factions hate each other but not so much as they hate all foreigners. They disagree completely on the amount of steel and brimstone that should go into Army methods, but they have a common goal—the expansion of the Japanese Empire. Internal rivalry has not been permitted to interfere with the prosecution of this aim.

Notes on Germany. A considerable number of Nazi leaders reportedly are going "underground" by having fake obituaries of themselves printed in German newspapers. Thus they hope to work after Germany's defeat, in Switzerland and Sweden and even Germany under false names and without having to shoulder the responsibility for their former murders, thefts and other misdeeds. . . . Because of the increasing petrol shortage there are many more horse cabs than automobiles on the streets of Berlin. . . . Germany's largest ARP shelter, near Bochum, has been finished. It is a natural cave and contains among other conveniences, a merry-go-round for amusement of children during air attacks.

Tricks. As we have emphasized before in this department, the Jap is a crafty and cunning soldier. Here are some of the tricks currently worthy of note:

- Activity and noise in the form of lighted cigarettes, firecrackers, moving vehicles and barking dogs have been used opposite our positions to lead us to believe a counterattack was imminent.
- Booby traps have been fastened to dead Allied and Jap soldiers and fuzed to detonate when the body was moved.
- A dead Allied soldier has been put in a conspicuous place, with a concealed automatic weapon nearby pointing at the dead man. When Allied troops attempt to remove the body, they are shot.
- Badly wounded or apparently dead Japs have thrown hand grenades at medical personnel going to their aid.
- Firecrackers have been used to simulate machine-gun fire.

Inside Germany. Eight million foreign workers inside Germany are helping to meet the Nazi need for manpower, but they constitute a growing threat of disorder within the Reich.

This labor group includes 3,000,000 nationals of the Soviet Union, nearly 2,000,000 Frenchmen, 1,500,000 Poles, 500,000 Belgians, between 300,000 and 400,000 Dutch and almost 350,000 each of Yugoslavs and Czechs. More than 2,000,000 of the total are prisoners of war. The others are conscripts torn from their homes by force, outright collaborationists from what were occupied countries, and volunteers who were attracted to German jobs by better working conditions and pay.

Eight million foreigners—the overwhelming majority of them forcibly detained in the Reich and actually Germany's bitter enemies—naturally would be a powerful force unwatched. Nobody knows this better than the Nazis. Their measures regarding foreign workers have fallen into two categories: (1) conciliatory measures designed to gain the workers' willing cooperation and (2) controls restricting movement and contact with the German population.

German labor authorities have given foreign workers in Germany, with the exception of prisoners, almost the same rights as those of German labor. Foreign workers, except Soviets and Poles, have been given German-standard food, pay and living conditions.

Other appeasement gestures include granting of compensation for air-raid injuries, inclusion in annual youth labor competitions and permission for local establishment of social clubs for various nationalities.

But travel by foreign workers has been forbidden except in cases of extreme emergency. Whereas German absenteeism is reported to labor authorities, foreign absenteeism is reported to the police.

Foreign workers who heretofore have lived in private homes are being transferred to labor camps as rapidly as space in these camps permits.

Despite this program, many man-hours are being lost because of runaway foreign workers. Since most of France and the Lowlands were liberated, the escape route is shorter and more promising, and many of the foreign workers no longer have to worry about their families being punished by the Gestapo.

The several million hostile foreigners inside Germany are disorganized. They are of different nationalities. They are closely watched. But they have this common bond: they hate the Nazis.

Portrait by the Enemy. Japanese Imperial Army Headquarters recently ordered field commanders to give their opinions of American fighting ability.

One Jap commander reported: "The American understands machinery and is adroit at handling it. Speed characterizes his construction of airfields, motor roads and communication networks, and also his strengthening of positions. His strong air forces execute day and night attacks."

Another observed: "The basis of the tactics of the U. S. Army may be said to be a belief in the almighty power of materialistic fighting strength. Although Americans are not adept at military deception and subterfuge, their leadership is extremely reliable and their spirit in the offensive should not be treated lightly. In an offensive the customary tactics of the U. S. Army are to cut supply lines, isolate strategic key points and, by concentrating air and ground strength, exhaust and eventually capture these points. It has been established that the enemy is capable of altering his tactics quickly."

And another: "Against his admitted military assets, we must set down the decided weaknesses of the American soldier. He depends too much upon his material power and is deficient in spiritual strength. The men's sense of personal responsibility is not consistently high and there are many flaws in their security measures. U. S. forces, who place all faith in firepower, are weak in hand-to-hand combat. In this respect they certainly are not to be feared. We must guard against making headlong and reckless advances, however, even when we are achieving success in hand-to-hand combat . . . U. S. fighters are noisy, and a security-conscious soldier is the exception rather than the rule."

Air Defense. The Germans have been compelled to give their air defense system an overhauling. It worked fairly well when Allied bombers had to cross the Channel before reaching the bomb targets, but when our bombers starting operating from forward bases, Jerry found that he didn't receive the warning soon enough to get ready.

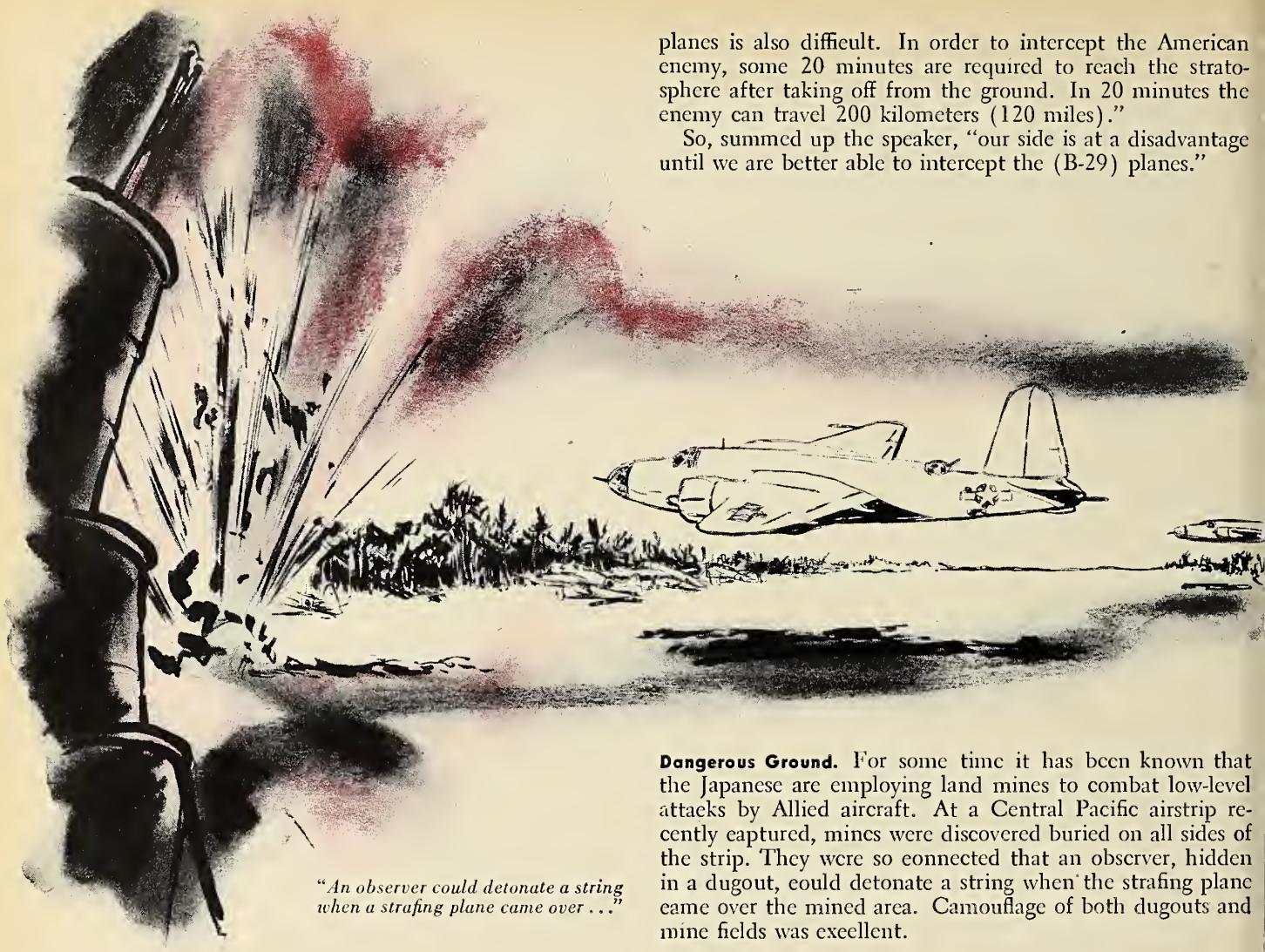
Before the invasion, the warning system gave Nazi fighters a chance to determine where their forces should be concentrated, and planes could be drawn from one area to defend another. Fighter pilots could rest in comfortable ready rooms until informed where they were needed.

But now they can't wait around for the warning. They must keep on the alert. Whenever reports indicate possible flying weather—even though the radar hasn't picked up a thing—German pilots must warm up their planes and sit in them, ready to take off if and when our bombers or fighters come. They must do this even if it entails several hours of useless waiting.

The German fighter defense system is organized now to function in this way: First, the weather service reports both German and Allied weather conditions as they will affect take-offs and landings and gives predictions of cloud types and heights. Next, long-range radar attempts to warn of approaching aircraft. Then, as the bombers come over Germany, radar and visual and aural observation keep tabs on the formations. When Jerry fighters take off they are directed to our bombers by controllers on the ground.

Many of the enemy's flak guns and balloon barrages have had to be redispersed. He has grouped his heavy antiaircraft guns into Gross-batteries, or three batteries of six guns each. But some of his flak guns have been moved from inner homeland defenses to the Siegfried Line as artillery pieces to be used against our invading armies. This does not mean that there is a serious shortage of light or heavy antiaircraft, but that the enemy does not have enough to spread everywhere as thickly as he would like. This is indicated by a partial substituting of balloon barrages for flak guns at smaller targets such as communications centers, railway yards and bridges, and power transformer and switching stations. These latter installations are now more and more the targets of our strafing and

"But now they can't wait around for the warning . . ."



"An observer could detonate a string when a strafing plane came over . . ."

bomb-carrying fighters rather than our heavies. The enemy hopes the balloon barrages will prove as effective a defense as flak. Twenty balloons usually are employed to protect important bridges and 10 to shelter a power station.

A Better Way. It is Jap strategy when retreating to place obstructions on airfields so that we can't use them immediately. They use trestles, logs, mounds of earth, ditches, trenches. But frequently of late, they have found it more practical to leave behind them merely the craters from Allied bombs.

'Moonbeam'. Four 20 mm guns now are fixed aft of the cockpit on the Irving II, Jap night fighter. Electrically operated, each gun is fed by a drum containing 100 rounds. A fifth 20 mm gun is placed forward. Jap designation for the Irving is Gekko or "Moonbeam."

Facing Facts. In a talk beamed to the Empire, a Tokyo radio reporter recently gave a "realistic" appraisal of the difficulties involved in meeting our B-29 attacks. While maintaining that B-29 forces are suffering "huge" losses, the speaker pointed out that "it is difficult to discover the enemy from our (Jap) standpoint. Of course it is possible to intercept them with electric wave finders but it is difficult to do so with only the capacities of the ordinary plane finder."

Also, this speaker said, "It is difficult for antiaircraft shells to reach the American planes" and "interception by fighter planes is also difficult. In order to intercept the American enemy, some 20 minutes are required to reach the stratosphere after taking off from the ground. In 20 minutes the enemy can travel 200 kilometers (120 miles)."

So, summed up the speaker, "our side is at a disadvantage until we are better able to intercept the (B-29) planes."

Dangerous Ground. For some time it has been known that the Japanese are employing land mines to combat low-level attacks by Allied aircraft. At a Central Pacific airstrip recently captured, mines were discovered buried on all sides of the strip. They were so connected that an observer, hidden in a dugout, could detonate a string when the strafing plane came over the mined area. Camouflage of both dugouts and mine fields was excellent.

Volkssturm. There were two major political reasons for the creation last October of the Volkssturm or "People's Army" under exclusive control of the Nazi party.

First, by organizing all men "between 16 and 60 who are able to carry arms" Hitler was reinforcing his party's control of the masses. The nazification by decree of all German army officers had been much for the same reason. Both measures were intended as aids to the Gestapo's iron fist in keeping matters in hand.

Secondly, while maintaining the Nazi party at the pinnacle of command, Hitler wanted to make the German people, the German army and the Nazi party seem synonymous. Thus he thought to destroy the effect of any Allied propaganda directed to the German people or to the army against his Nazi party.

Thus, too, he hoped to create a threat of united guerrilla warfare by the German people that would induce the Allies to abandon demands for unconditional surrender. Himmler himself is responsible for the military training of the Volkssturm.

A Stockholm newspaper correspondent writing from Berlin remarked concerning the Volkssturm: A militarily disciplined organization now exists which can be used in the event of any attempt to revolt on the part of foreign workers. No mass flight from the industrial areas threatened by air attacks or the military situation need be feared any longer, as the Volkssturm regulations state that workers must immediately take up their weapons and that shirkers will be treated as deserters.

A recent Volkssturm rally was described as follows: There

were old men there with grey moustaches and protruding stomachs; there were ticket collectors from train cars, chauffeurs and postmen. They carried an assortment of weapons including long muskets and carbines, and even double-barreled shotguns. Boys carried hand grenades in their belts. Some wore steel helmets, either the usual German ones or round, grey Italian helmets. Others wore berets or skiing caps.

Evolution of Moods. Radio Tokyo has developed a series of special patriotic quivers for describing defense against Superfortress attacks. "Our Wild Eagles," proclaimed one announcer, "attacked the force of Flying Hippopotamuses and brought down all but a lonely few, which deserted their formation and scurried home." This rhetorical excitement represents one stage in a cycle of attitudes officially approved for comment on Superfortress attacks. This cycle of moods in which the B-29 exploits have been reported to the Japanese people represents a varied repertory of propaganda.

The B-29s were first treated with contempt. In all comments, American aircrews were customarily dubbed "fools." There was an inclination to laugh the whole thing off. Then came a mood devoted mainly to recrimination; in radio accounts, the B-29 crews changed from blithering idiots to cowards. Contempt was traded for incoherent anger.

From this attitude the radio announcers went on to a lyric celebration of the defenders of Tokyo—a mood that any nation might be expected to indulge in under the circumstances, but one to which the Japanese narrators lent an almost incoherent rhetoric of patriotism.

The commentators later began to emphasize the great mechanical advances of Japan's defending fighters. Without giving any details, of course, "our new fighter" became the refrain of every prediction concerning the defense of the islands. It is significant that recently the propaganda chorus has dwelt on the ability of the Japanese civilians to "take it" without benefit of wild eagle pilots or Utopian fighter planes.

New Flak. Incendiary flak pellets are being used by the Germans to start fires inside our airplanes. They are shot into the air in shells similar to those of ordinary flak. When the shells explode, the incendiary pellets are sprayed.

Pellets which failed to ignite have been recovered from our planes. The cap is painted yellow. Ignition apparently is caused by a direct blow on the pellet cap which drives a firing pin into a primer. This, in turn, fires an incendiary powder. The pellets are a little over an inch long.

The Raiden. The Japanese have a new fighter, which they say is scaring the wits out of us. A Tokyo radio reporter gave this description, none too detailed, of the new fighter:

"The first time the 'Raiden' (Jap word for "thunderbolt"; we call the plane the Jack—Ed.) flew in the skies over the Philippines, your reporter instinctively headed for an air-raid shelter looking closely at the planes. As the planes drew nearer, I could see that it was our new type fighter plane which possessed a very firm and stout body, wings which stretched taut, and machine-guns of a certain caliber. Ah! This reporter has never seen a more splendid fighter plane!"

Der Blitz. It was July 31, 1944. Field Marshal von Kluge, German commander-in-chief on the Western front, picked up his telephone. He asked for the chief of staff in one of his army groups.

"The enemy has reached Avranches," he said. "Our 957th Infantry Regiment of the 363rd Infantry Division has apparently not moved owing to hitherto unprecedented enemy fighter-bomber activity. Enemy tank advances on Granville and Avranches were preceded by an umbrella of enemy fighter-bombers. This made movement almost impossible. The troops have suffered high losses in men and equipment by strong air activity and morale has greatly suffered."

Then von Kluge called the chief of staff of the German 7th Army and said:

"Yesterday's heavy fighting was successful for the enemy only because he paralyzed all our movements by employing fighter-bombers on an unprecedented scale."

Field Marshal von Kluge made a third call—this one to General Warlimont, Hitler's personal representative in the west. He said:

"The enemy's air superiority is terrific and smothers almost every one of our movements. Every movement of the enemy, however, is prepared and protected by its air force. Losses in men and equipment are extraordinary."

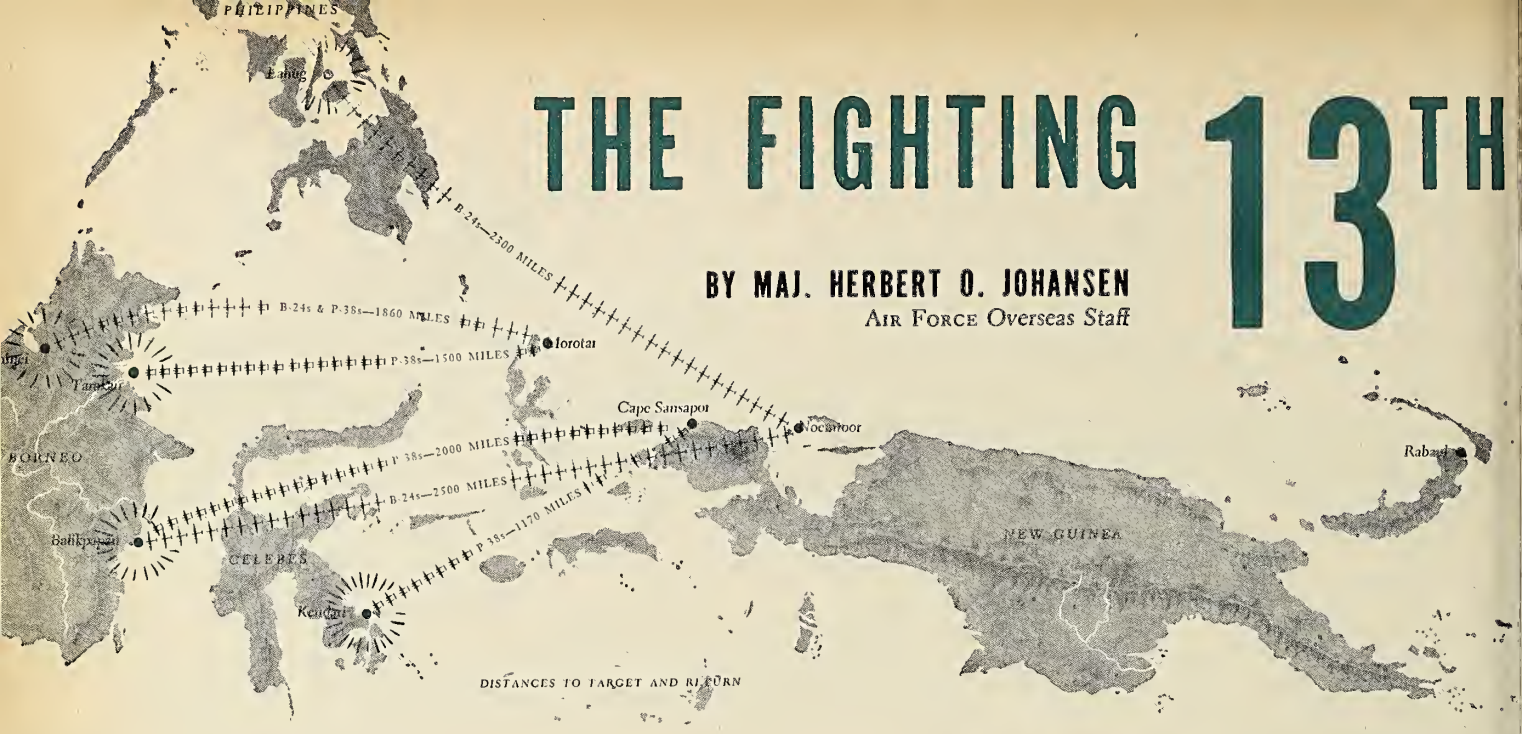
These conversations were recorded in an enemy top secret telephone journal, which has been captured.

Brawl. The long-standing feud between the rival Jap parties, Kodo-ha and Tosei-ha (see "Family Argument," Page 12), frequently manifests itself in the form of barroom brawls. A typical "incident" was reported recently. It started when a major from Hikodan, or Air Brigade Headquarters, knocked over the table and knocked out a lieutenant. A couple of captains and a worker from the General Affairs Bureau (Somubu) joined in. A plain business man who, according to the Thought Police, didn't know exactly what was going on hit one of the captains over the head with a chair. And so it went until, as Tokyo press accounts pointed out, the principals "were removed from the scene." ☆

"The long-standing feud manifests itself in the form of barroom brawls..."

THE FIGHTING 13TH

BY MAJ. HERBERT O. JOHANSEN
AIR FORCE Overseas Staff



Lately the Jap has changed his mind about a lot of things so far as the air war in the Southwest Paeific is concerned.

He thought his strategic installations in the Celebes and China Seas were beyond the range and audacity of our bombers and fighters. The smouldering ruins of his Balikpapan and Tarakan oil eenters quickly put him straight on that point.

He flaunted his heavily armed merehant vessels and warships under the very bomb bays of our B-24s, secure in the belief that heavies were unable to attack suceessfully from the neeessary high altitude. That security reeeived a staggering shock when direet hits were scored on the Yamato, his largest battleship, in a series of B-24 shipping strikes that sent other of his large merchant vessels and naval craft alike, to the bottom.

It took some irrefutable arguments on the part of the 13th Air Foree to ehange his mind, but superior bombing technique, painstaking planning and daring initiative did the trick. Losses for us have been heavy at times, but these have been far outweighed by suceesses that have put the 13th ahead of the Jap schedule of expected attaek, thus catching him with his defenses down.

Tarakan, Borneo, 318 miles north of Balikpapan, is an example of painless—for us—bombing. The 13th Air Force planning staff had long had its eyes on the rich oil faeilities at Tarakan, which in some ways are unique. There is no refinery. The oil is simply separated from the water and transferred into storage tanks, from which it is pumped directly into waiting ships for bunker fuel. It was to be a knockout blow, which meant waiting until it could be hit with everything in the air force that could fly and carry bombs.

The day came on November 18. To the heavy bombers was assigned the huge separating plant. Two large storage tank farms were given to bomb-carrying P-38s. B-25s drew the shipping in Tarakan Harbor. The entire air armada was to be screened by a P-47 fighter cover.

From reconnaissance the 13th knew that the mission would catch the Jap unprepared. He was. There was no fighter interception and only light ground fire. Only one of our planes was lost—a fighter. The result: 24 hours later the installations were burning as if they had just been bombed. Forty-eight hours later reeco reports said that they were still burning fiercely.

The only explanation of the lack of enemy opposition and interception at Tarakan, according to Brig. Gen. William A. Matheny, commanding general of the 13th Air Force Bomber Command, is that the Japs just did not believe we could or would strike there, especially after the heavy losses we had sustained at Balikpapan. Already the Jap has been given an excellent idea of the fate awaiting his other strategic targets in the area.

But before Tarakan came Balikpapan, which was a differ-

"Bomber Barons" attack airdrome on Negros Island as part of Leyte operation. Runways were blasted, 22 planes probably destroyed.

Balikpapan paraffin and oil refineries were smashed on Oct. 10, 1944, by 200 bombers that flew 2,400 miles in 16 hours with record load.

Thirteen is an unlucky number—for the Japs. The bombers of the 13th Air Force and their fighter escorts have smashed at enemy targets all the way from Rabaul to the Philippines

ent story. Balikpapan was the first strategic target to come within range of our Southwest Pacific bombers. It supplied from 15 to 30 percent of Japan's aviation fuel and, as a prelude to the Philippines campaign, it was essential that its production be halted for the time being.

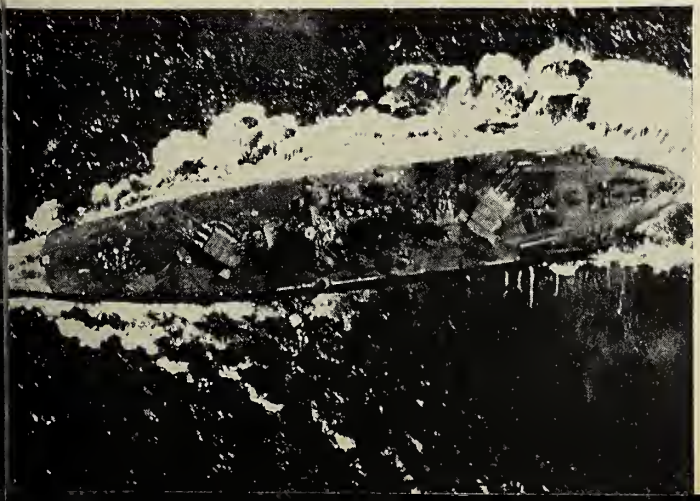
The 13th Air Force was used for long-range bomber missions without fighter escort. Strikes at Yap, Palau and Truk, ranging from 1,400 to 1,800 miles, had been routine, but Balikpapan was better than a 2,000-mile round trip. It was not only a matter of flying this unprecedented distance over water against one of the Jap's heaviest defended installations without fighter escort, there also was the problem of a night take-off for the largest number of heavy bombers ever assembled on a single airstrip in this theater. Col. Thomas Musgrave, commanding officer of the Bomber Barons, admitted frankly: "We were scared to death when we were told of the assignment."

A Balikpapan planning staff was organized. Among its problems was extending the range of the B-24 while at the same time increasing its load capacity.

As a first step, bomber command and group experts, working with factory technical representatives, arrived at the most desirable power settings for the engines to give the longest possible range at a minimum speed of 150 miles

Jap battlewagon of Kongo class churns sea in frantic effort to zig-zag away from a B-24 attack that scored 2 direct hits, 10 near misses.

Yamato class battleship was caught in Sulu Sea by 13th AAF "Long Rangers." Battleship fired at B-24s from 10 miles with 17.3 inch guns but Libs came on to score one hit, 15 near misses inside 1,000 ft.



per hour. A new and more efficient schedule of gas transfer was evolved. The best flying altitude was determined. But above all, there was the challenge of making it possible for the B-24s to carry a load some 12,000 pounds in excess of the maximum capacity load for which it was designed.

This called for a delicate and constantly changing load adjustment schedule. Every item that was to go into the planes was weighed on scales. The weight chart gave exact built-in weight of the B-24. Next, using the weight and balance chart and considering bomb and gas load, the exact position for every minute of the projected 16-hour flight was figured for each crew member. Calculations even included each parachute, ration kit, and life raft.

As gas was consumed on the mission, each crew member and every inanimate object would change position within the plane according to a precise, predetermined plan. No variation was allowed. Flight tests were run with full loads. First in daytime then at night, simulated missions were flown to targets matching exactly the distance to Balikpapan. These gave actual time in the air and total fuel consumption. On these tests the planes returned with a minimum gas variation from the theoretical consumption of two gallons, a maximum of 80 gallons. In all cases actual consumption was less than the theoretical and the 13th Air Force knew that the Balikpapan mission could be flown successfully as far as range was concerned.

Then came midnight, September 30. All the figuring, sweating, training was to be put to the actual test. Nothing had been overlooked. Because of the long duration of the mission, the time of moonrise and moonset had to be calculated as well as sunrise and sunset; even the tides had to be figured for the benefit of crash boats standing by.

In spite of insufficient lighting, dispersed revetments and curved taxiways, the first 48 Liberators rolled down the runway with perfect timing and were airborne within 48 minutes. Each plane was timed on a sweep-second stop watch and given its starting signal by means of a green starting light. Due to the heavy loads and limited taxiways, mishaps had been anticipated, but crippled or wrecked planes couldn't be allowed to delay the schedule. Bulldozers were ready to shove the incapacitated planes out of the path of the next taxiing plane. Rescue squads, wreckers, bomb disposal crews stood by; during it all, the entire island base was put on condition green. Even an enemy air attack could not be allowed to interfere with the mission.

For 16 hours the entire 13th Air Force from the commanding general down to mess orderlies sweated out that mission. The distance, the heavy loads, strong enemy opposition against unescorted heavies, all added to make the suspense almost unbearable.

At the halfway mark came relief in the form of a radio message that the planes were over the target. They had dropped their bombs and were fighting their way back through heavy enemy fighter interception. Then at the end of an eternity the first plane came lumbering in. Reports were amplified with the information that the Balikpapan oil installations had been left in roaring flames with smoke seen rising to 18,000 feet. There were planes lost, others unreported, many crew members were wounded and others dead. But the main thing was the all-important message that could be radioed to higher headquarters: "Mission accomplished."

The mission was repeated a few days later, again without fighter escort. Enemy opposition over Balikpapan was even more intense and our losses were heavy. For the third and fourth strikes, long-range fighters were brought up to a forward base and escort furnished; our losses decreased.

To the escort units of the 13th under command of Brig. Gen. Earl W. Barnes, long-range fighter missions were no novelty. Round-trip fighter sweeps of 1,400 miles were routine. Just as the B-24s achieved longer range by more than just pouring in extra gas, so the extended range of the P-38s and other fighters necessitated more than mere addition of larger belly tanks. As in the B-24s, a precise power-setting for maximum performance at a set speed was evolved. A special flying techinque was necessary due to the heavy gas load which had a tendency to make the plane mush along. Pilots were instructed to maintain their planes at a certain altitude. This technique, called flying by altitude, enabled the fighters to be flown rather than pushed through the air, thus conserving sufficient gas to increase their range by hundreds of miles.

The payoff for the 13th fighters came in the middle of November when they escorted heavy bombers on a long range mission to Brunei, on the west coast of Borneo, for an attack on a large Jap naval task force. On this history-making mission, the fighters flew 950 statute miles each way, a total of 1,900 miles. It is true that some of them landed at home base with only a few drops of gas in their tanks, but they did come back.

Between long-range strikes at strategic targets, the Bomber Barons and other heavy bomber units of the 13th rolled up an impressive score of ship destruction from high and low altitude, depending on the size and firepower of the vessels under attack.

The Japs had not entirely misplaced their confidence when they shuttled back and forth in the security that our heavy bombers could not successfully attack their ships from high altitude. From 20,000 feet and up, hits on moving targets could not be guaranteed. With this knowledge and experience the 13th employed a technique for high altitude bombing of shipping at 9,000 feet. This put the attacking planes above the most effective range of 20 and 40 millimeter antiaircraft fire but not beyond the range of heavier guns. That was the risk that had to be taken.

The technique of bombing ships at 9,000 feet, General Matheny explains, is rugged, bloody and costly, but very effectual. At that altitude it is possible to spread sighting shots so that a hit is a virtual certainty.

In this type of bombing, approach to the target is made in a modified combat box formation. When six or seven miles away from the target, the squadrons break off in sequence at set intervals. The lead squadron bombardier sights for range and deflection and his wingmen drop on him. Lead bombardier of the second flight sights for range only, and his wingmen drop on him. This is standard procedure for each squadron. Results of this technique as employed by heavies of the 13th Air Force on many shipping strikes within the last few months have proved its deadliness. It gives a small enough unit formation to produce maximum maneuverability with the largest bomb pattern consistent with such maneuverability; it affords a more accurate method of sighting an evasive target; it allows maximum fire support within individual units, and its pattern is sufficiently large to compensate for errors in sightings and evasive action of target.

Closely following the sinking of a cruiser by means of this bombing technique by the Bomber Barons, their rivals, the Long Rangers, sighted a concentration of 12 Jap warships in the Sulu Sea. While still 10 miles away, they were amazed to find themselves the target of fire from the heavy guns of one of the ships. The ack-ack became heavier as they neared the target. The B-24s didn't waver. They made their run and dropped their bombs despite the most violent evasive action taken by every ship. On one task force the heavies scored hits on the two large battleships and sank and damaged several smaller ships.

(*Continued on Page 60*)

SITUATION NORMAL...

ILLUSTRATED BY T/SGT. DON BROCKELL

BY LT. BERT STILES

339th Fighter Group, 8th Air Force

Ever wondered what it's like to ride a Mustang to Munich and back? Well, it's a lot like this . . .

The overcast was five miles or ten miles thick, and it started at the ground. So the bombers didn't go.

We were supposed to shoot up a certain railroad siding down near Munich where there were supposed to be oil cars.

There was much mud on the field, and much on my windshield before I got off the ground. The visibility was lousy. We almost ran into a Stirling.

The clouds broke up when we hit the coast and we went up. There were strings of 51s and 47s in back of us and on the sides and probably up ahead.

The relay station came in with, "There are bandits operating in the Cologne area." All bandits are in the Luftwaffe.

There was a high overcast at maybe 22,000 and no low clouds. The ground looked peaceful, but it probably wasn't. We flew over the line somewhere just south of Aachen.

Somebody called in two planes up at two o'clock high.

Somebody else called in four planes at two-thirty high.

I saw them.

They were coming right for us. I flicked up all the switches and got ready to drop my tanks and turn into them shooting.

In two seconds, I'll break, I decided. I shook with anticipation. I guess it was that.

"Little fat friends," somebody sang out.

"They're Jugs," somebody else said in a relieved voice. P-47s, he meant.

They swung off maybe a mile out, showing that big slice-of-orange wing and went off to look for something else.

There was sweat on my hands and sweat on my legs and everywhere else.

We were fanned out in battle formation. We were looking around. We were ready for the Luftwaffe.

"Bogies at nine o'eloek," somebody ealled in. Bogies are unknowns.

Somebody else ealled them a little louder.

"They're 109s."

I flieked the switehes on again. There was a buneh of planes up high at nine o'eloek.

"Drop tanks in 15 seeonds, White flight." That was us. I let mine go in about three and was tied for last.

We went into a sereaming turn to the right. I jaeked up the rpm's to the firewall and gave it full throttle.

There were 51s all over the sky in a big swirl.

I kept swiveling around. 51s on my tail. 51s at every hour on the eloek.

"We turned the wrong way," somebody said.

They were at three o'eloek, not nine.

Twenty or forty of them slid through. Green flight elimbed on the tail-end man. He elimbed up. They outelimbed him. He did a half-roll. They watehed. He went into a shallow turning dive, and the one and three man pulled up his tail and elobbered the hell out of him. (I got all this later).

"He bailed out," somebody yelled.

"Eeeeeeeeyow!!!!!!"

Our flight did five or ten more turns and saw lots of 51s.

"We'll go down here," Red leader ealled in. "We haven't got enough gas to go all the way."

So we started down and we started looking. We flew over some hills and some trees and some towns and some railroads and we finally saw a town and a railroad in some hills that must have pleased Red leader.

And we went down. We went down in a woozy spiral, and we strung out. We elipped in over the spruee tops doing 400.

I was flying on my element leader. I went where he went. Once we went almost the same plaee. I slid under his tail, and over the top of a ehureh steeple with 12 inehes to spare.

It was Germany and it was pretty and peaeeful and we didn't see anything to shoot.

We skimmed over a hill and there was a train. We didn't shoot it either, beeause we were already past.

We raeked into a 90-degree bank and got into string and went baek around. Everybody was there. I lined up on a hunk of train and flieked on my gun switeh . . . then I kieked into a turn and jerked baek on the stick when a 51 moved in, in front of me.

When I grabbed the stiek I grabbed the trigger too. The 51 didn't get it, for some reason, but a big old two-story house did. The top story got a burst of traeers and then we were past again.

We went round and round. There were enough 51s to shoot up ten towns that size. Somebody got the engines on the first pass. There were two trains and we shot the hell out of them.

There was an oil tank, I guess. It had blaek smoke and it burned niee. Several other things burned and blew up.

Then somebody went in. The whole works blew when he first hit the ground, and the engine went shooting up over a little hill into the trees.

There were two kids and a bike out in the middle of a street watehing. Some people somewhere were shooting flak at us.

I saved one burst till I was really down on the train and saw somebody else had already burned out that ear. I horsed baek and made it over the hill with an ineh or two to spare and went into my turn.

There was a guy down there about ten feet off the end of my wing, shooting a double-barreled shotgun at my element leader. He didn't give a damn. When we eame baek he was gone, prudently.

Then everybody was gone. I was all alone in the haze dusting over hill tops, looking for somebody, looking for anybody.

Then I saw a ship.

"This is Red leader, I'm going up," came over the radio.

There was a guy going up, so I went up too. Then there was another guy.

I eheeked my tail and there were two jokers right on it. I broke left.

Little friends.

We went up. We went way up and everybody joined in.

"Where's White four?" eame over the radio.

"I think he got it baek there in the town." There was sorrow in the voiee.

"I'm up here in Red flight," I said happily.

I eut my throttle baek and put down flaps and faded baek to White four position.

I flew in elose and thumbed my nose at the element leader.

So we flew home. And nothing else happened to us. But plenty was going on. Everybody else was still down there talking loud and ineoherently, jamming up the radio.

"Don't shoot me, I'm your leader," somebody else said.

"TS" somebody consoled him.

"I'm out of oil," the same guy said. "I'm out of everything."

We waited.

"I'm OK," he said a minute later. "I'll make it OK."

We relaxed. He bailed out ten seeonds later, maybe in Germany, maybe in Franee.

"Look at them barrage balloons."

"The lousy bastards . . ."

There was no telling what was going on. Somebody hit something, somebody got hit.

"I'm hit." Chaos on the radio.

"You got him."

"EEEEEEEowowow!"

"Attababy."

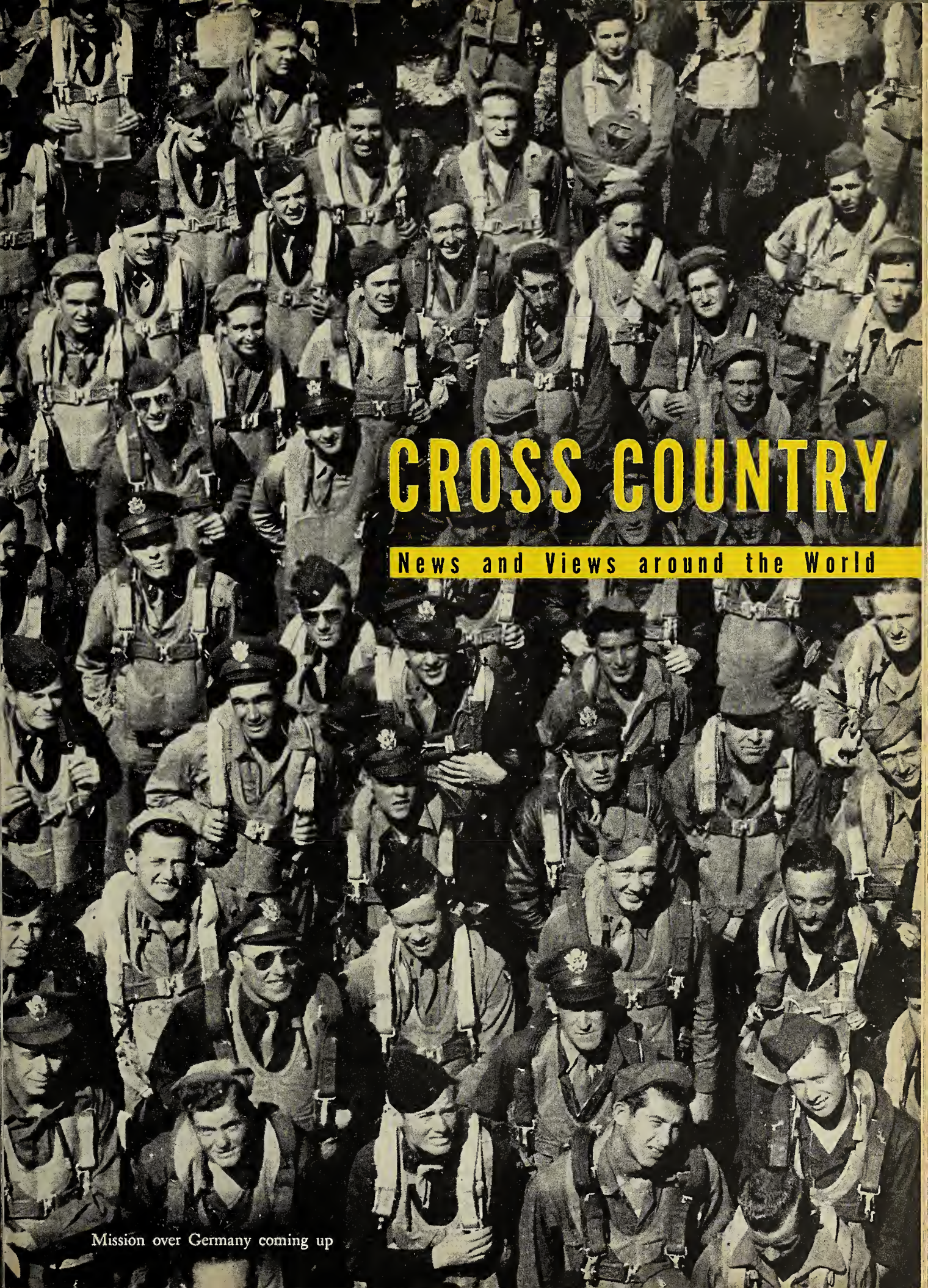
Franee was pretty. We let down to get under the front of elouds eoming up. I did three rolls going down.

Four hundred thousand men were moving up along a line from the Dutch Coast to Switzerland. A eouple of trains were lying baek there, dead and smashed. A little village was shot up and seared and still there.

I sat still, then I did another roll, than I looked down at the soft green world. There wasn't any sense to it all.

This is war, I thought. This is war in the air. ☆

"... shooting a double-barreled shotgun at my element leader."



CROSS COUNTRY

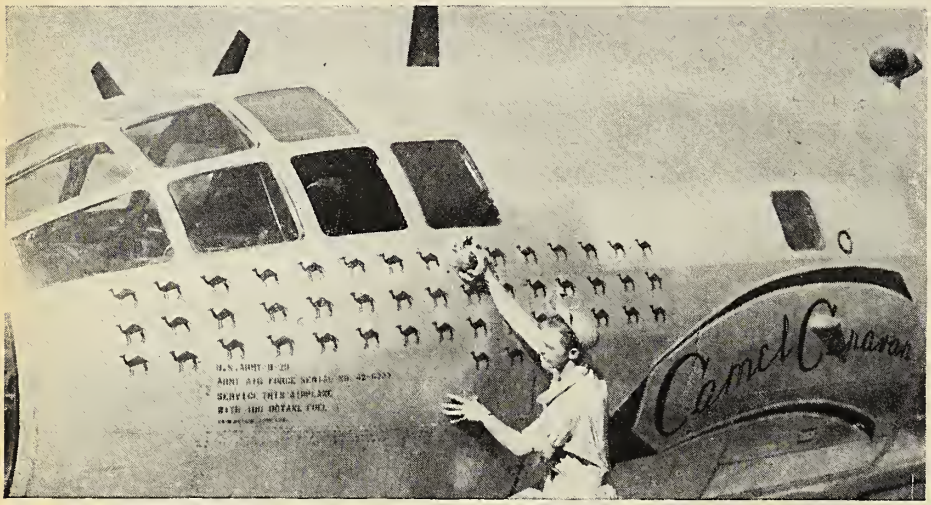
News and Views around the World

Mission over Germany coming up

Pioneers of the 'Double-X'

When the roar of B-29s over Japan reaches its climax, the first six months of operations by the 20th Bomber Command from bases in India and China will be little more than a memory.

But every B-29 crew of the future will owe a major share of its success to the men of the "Double-X" who opened up the road to Japan by proving the combat worth of the previously untried bomber and discovering how it could be flown most effectively and economically. Bare figures on the 20th's operations for the first half-year aren't very startling: 20 missions against enemy targets from Bangkok to Kyushu; 148 Jap fighters destroyed, 77 probably destroyed and 126 damaged; 22 B-29s lost to enemy flak and fighters.



A camel for every crossing of the Hump

The 20th's Captain Ledford at a China hospital

Lessons learned, techniques developed and initiative and courage displayed, however, are not reflected by mere statistics. Figures don't describe the hundreds of thousands of Chinese coolies and Indian laborers building airfields in China literally with their bare hands. They don't tell of the Superforts which, in the early days, were stripped down and used as flying tankers to haul enough gasoline over the Hump for the 20th to carry out assigned bombing missions. Some of the planes have as many as 50 camels painted on their noses, each indicating a round trip over the Himalayas.

Nor does a mathematical compilation make any mention of the valor of the B-29 men, of men like Capt. Jack Ledford, pilot of the "Heavenly Body." Returning from an attack on Omura, Ledford and his flight engineer, M/Sgt. Harry C. Miller, were wounded by machine gun bullets. The pilot's right hip was fractured and the flesh laid open, exposing his hip bone, backbone and kidneys. Miller was hit in the head and knocked unconscious.

Refusing medical aid until Miller had been treated, Ledford turned the controls over to his copilot and handled the engineer's instruments for 45 minutes until he could no longer continue for loss of blood.

Gasoline shortage caused two engines to fail, enemy bullets apparently having punctured the fuel lines, and, when the plane reached unoccupied territory, Ledford ordered the crew to bail out for it was obvious the Superfort could not reach a landing field.

At the pilot's direction, the shroud lines of an extra parachute were cut off and attached to the leg of the navigator's table and to the unconscious engineer's parachute ripcord ring. Thus, Miller's chute was opened automatically when he was dropped through the nosewheel well.

Bailing out a few seconds later, Ledford deliberately delayed opening his parachute until he had fallen 5,000 feet so that he would be able to land near his helpless crewmate. His heroism was in vain, however, for Miller died in a Chinese hospital without regaining consciousness.

Then there was the time that "The Pioneer" lost an engine and turned for home. To lighten the plane, the rear bomb bay was opened to dislodge an auxiliary fuel tank. But the tank was caught and hung half off its shackles, banging against the bomb bay doors and causing a drag which pulled the plane toward the water.

S/Sgts. Gerald K. Tefft and James W. Carr seized fire hatchets and crawled into the bomb bay. Unable to wear parachutes because of the cramped space and working in total darkness with wind and rain swirling about them, the men were in constant danger of being caught in the loose tank's swinging cradle harness. But they hacked and hacked for 15 minutes until finally, with the plane only 700 feet above the water, the tank fell free.

Instances of masterly pilotage were numerous in those first six combat months for the 20th. The "Raidin' Maiden" ran out of gasoline returning from Singapore—10 miles short of home and 10,000 feet in the air. Capt. Charles Joyce, the pilot, signalled his crew to bail out and four men jumped. But unknown to Joyce, the alarm bell in the rear of the ship failed to ring and the gunners remained aboard, waiting for the signal. Fortunately for the gunners, the pilot decided to save the plane rather than leap for safety himself, and the engineer elected to stay with him. Joyce made a perfect landing, in the clear, only 40 yards short of the home runway. Several hundred mechanics and other ground personnel, who had watched in anxious silence, cheered wildly as the "Raidin' Maiden" coasted down the concrete strip.

B-29 men know it's a notable feat to land one of the bombers with fewer than three propellers working. But with the landing gear of the "Windy City" shot out of commission, three engines dead and the fourth propeller turning at only half-speed, Maj. Gust Askounis brought the plane in for a neat belly landing after an attack on Yawata on August 20.

Successful operation of a big bomber, however, depends more often upon teamwork than upon individual action, and the accounts of heroism among the 20th's personnel usually are concerned with an entire crew rather than one person. The conduct of the crew of the "Last Resort" during one of the missions against Omura, Japan, provides a typical example.

Making its bomb run on the target, the "Last Resort" was intercepted by 20 Jap fighters which, within a short time, knocked out three of the B-29's engines and most of its instruments, punctured its fuel tanks, and forced it to drop out of formation.

As the enemy planes closed in for the

kill, Maj. Donald W. Roberts, the pilot, turned over the controls to the copilot, Lt. John C. Harvell, and went to work assisting the engineer, F/O Elmo W. Gray. Together they got a second engine going.

Manned by Lt. Harold W. Dickerson, S/Sgts. Irving W. Smith and Jack I. Mueller and Sgts. Rolland W. Geisler and Everett J. Nygard, guns of the "Last Resort" destroyed three Jap fighters and sent two others disappearing into the clouds, leaving trails of smoke behind them.

Despite the loss of many instruments, Lt. Raphael W. Ford, navigator, safely guided the "Last Resort" to an emergency landing field in China. Using baling wire, friction tape and some odd spare parts obtained from the Chinese, the crew patched up the plane and flew it home the next day.

Such are the qualities displayed by the men and planes of the 20th during its first months of combat—qualities which will insure the ultimate success of our air campaign against Japan.

(For the basic information contained in the foregoing item AIR FORCE is indebted to Lt. M. Mortimer Kreeger of the 20th Bomber Command.—Ed.)

Story of a Bomber Pilot

The control cables of the B-17 were shredded beyond repair, the automatic pilot equipment was shot away, and the pilot was fighting to keep the crippled bomber from going in. Contact was made with the control tower of the bomber's base across the Channel in Britain.

Control: "See if you can head the Fort out to sea."

Pilot: "It's all I can do to keep it going. We tried to tie the control cables together to save the plane, but it's no go."

Control: "Use your own discretion."

Pilot: "We will try to turn around and head out to sea. We have no bombs."

Control: "Keep in touch with us."

Pilot, moments later: "We are ready to bail out. If I don't make it, good luck to you."

Control: "I won't need the luck—good luck to you."

First Lt. Loye J. Lauraine held the bomber level long enough for his crew to bail out but he was unable to get out himself. The Fort crashed with its pilot from 9,000 feet.

Continental Air Forces

Headquarters, Continental Air Forces has been activated at Camp Springs (Md.) Army Air Field, near Washington, D. C., to decentralize command functions over the four air forces based in the United States and the I Troop Carrier Command, and to place the operating functions of AAF Headquarters in the field.

Among the specific responsibilities of the CAF will be the air defense of the United States, the organization, reorganization and training of service and combat personnel, the preparation of units and crews for deployment overseas, and joint air-ground training.

During the early stages of its activation,

QUESTIONS
on Policy and Procedure

Q. May an officer or enlisted man reassigned after returning from overseas or transferred from one air force to another air force or a command continue to wear the shoulder sleeve insigne of the organization to which he was assigned previously?
A. *No. Personnel may wear only the insigne of their present organization. All except those assigned to a numbered air force must use the AAF patch (star and wings on blue disc). Nor may the insigne of previous assignment be worn on the right shoulder, regulations stating clearly that only one patch — that on the left shoulder—is permitted (AAF Ltr. 35-176, 4 January 1945).*

Q. If a transient officer pays a room fee while stopping at a base, may he certify that he did not occupy Government quarters in collecting per diem?
A. *No. An officer on per diem allowance will not certify that he did not occupy Government quarters solely because in connection with occupancy he was required to pay incidental room fees. Any expense so incurred will be considered as a steward attendance fee and not as the cost of the quarters themselves (Sec. I, WD Cir. 433, 1944).*

Q. In computing flying time, when does the flight officially begin and end?
A. *Flying time starts when the aircraft begins to move forward on the take-off run and ends when the aircraft, after flight, is taxied to a position on the ground where the engine or engines are stopped or any change in the aircraft crew is made. Flying time, however, ceases when the engine or engines are allowed to idle while the aircraft is stationary for a period in excess of a total of five minutes during such taxiing as may be required to complete one flight (AAF Reg. 15-5, 1 July 1943, as amended by AAF Reg. 15-5A, 3 October 1944, which supersedes AAF Reg. 15-5B, 6 May 1944, cited in Direct Hits,* AIR FORCE, *December, 1944).*

Q. Should the person designated as the emergency addressee of a soldier stationed outside the continental limits of the U. S. notify the War Department of a change in address?
A. *Yes. Unnecessary delay in transmitting casualty information to an emergency addressee often is caused by the addressee's failure to advise the War Department of a change in address. Military personnel stationed outside the continental U. S. should direct their emergency addressees to notify the Adjutant General, Washington 25, D. C., att.: Casualty Branch, as soon as any temporary or permanent change in address is made (Sec. III, WD Cir. 447, 1944).*

Q. Under Public Law 790, gifts sent by military personnel stationed outside the U. S. to persons in the U. S. are duty-free to the extent of $50 in any one shipment. Does the law limit the number of such duty-free shipments which can be made?
A. *No (Sec. II, Par. 4, WD Cir. 436, 1944).*

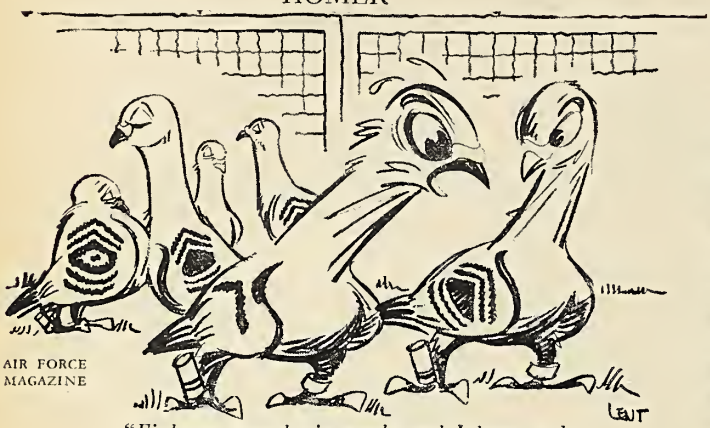
Q. What precautions should be taken in the storage of compressed gas cylinders?
A. *Compressed gas cylinders may be placed in open or closed storage, but they must be protected from dampness and against excessive rise in temperature from the direct rays of the sun or other source of heat. They will not be stored near highly inflammable substances nor in places where they may be struck by moving objects. Oxygen will be separated from inflammable gases or material and empty cylinders will be segregated. Good ventilation will be provided to carry off leakage or inflammable gases. Chlorine and acetylene gas cylinders will be stored upright and ammonia cylinders will be placed on their sides (Ch. 2, Par. 9, AR 850-60, 10 November 1944).*

Q. May enlisted men be held financially responsible for the loss or destruction of spectacles or dentures issued to them by the government?
A. *The Judge Advocate General has ruled that enlisted men may not be held financially responsible for loss of these items. Destruction or loss through design or willful negligence, however, violates the 96th Article of War (JAG Bulletin, Vol. III, No. 3, March, 1944).*

Q. What directive limits the information which may be placed in a Service Record?
A. *TM 12-230. Items of information or attachments not listed in this manual will not be made a part of the Service Record without approval of the War Department.*

PREPARED BY THE OFFICE OF THE AIR INSPECTOR

HOMER



AIR FORCE MAGAZINE

"Eighteen months in grade and I have to be transferred to an outfit like this!"

the CAF headquarters staff has been manned by AAF Headquarters personnel, with Brig. Gen. Eugene H. Beebe, formerly the senior American air officer on Lord Louis Mountbatten's staff, serving as acting commanding general. Approximately 3,000 officers and men are to be assigned to his command.

Higher-level policies and plans remain a function of AAF Headquarters.

Blunting Von Rundstedt's Nose

Lt. Gen. Carl Spaatz and his top-ranking strategic and tactical commanders paused briefly at Supreme Headquarters shortly after New Year's Day for a hurried appraisal of the air war. With the front lines completely weathered in, General Spaatz and his staff reasoned that this was as good a time as any to take quick inventory of the greatest winter aerial offensive in history—three weeks of violent air combat that had seen AAF and RAF bombers and fighters churn by the thousands through some of Europe's foulest weather to help stem Von Rundstedt's advance through Luxembourg and Belgium.

Shuffling through his reports, General Spaatz compressed the furious action of the past three weeks into cold but impressive statistics. Number of sorties flown by American aircraft since the start of the German counter-drive on December 16: 38,800; tonnage of bombs dropped: 35,500. Destroyed were thousands of tanks, railroad cars, locomotives, gun positions, bridges and fortified buildings. A revitalized Luftwaffe, rising in its first major offensive since the Battle of Britain, had been beaten back. The effort had cost the German air force 921 planes.

Such was the contribution of the 8th and 9th Air Forces and the 12th Tactical Air Command to the Allied armies facing Von Rundstedt's assault. It was sufficient to help turn the tide. As in North Africa and in Normandy, most of our available airpower had been thrown into a vast tactical operation over the battlefield and the scales had been tipped in favor of the ground forces. In the words of General Spaatz his flyers "had done their share in one of the great battles of history."

There were the pilots and crews of the 8th. They were eager. They took off for the Continent through fog that sometimes limited visibility to eight yards. Often it was so cold that one inch of ice coated the propellers. The East Anglian frost made skating rinks out of the runways but the bombers went up anyway — more heavily loaded than usual — and found their way to the front.

There were the fighter pilots both in England and on the Continent. The spirit at the fighter bases was reminiscent of D-day and Normandy. Fighters of all units played an important role in tactical cooperation with the ground forces. This is no reflection on the medium bombers which also were in the forefront of the counter-attack whenever the weather permitted them to get off the ground.

Weather in Europe at this time of the year can be divided into two kinds—bad and worse. Von Rundstedt started his thrust under cover of cloud and rain, and for the first week he had the weather with him. Conditions were so much in the enemy's favor, according to our staff correspondent on the Western Front, that General Patton sent a Christmas card to members of his command on which was inscribed a prayer for good weather.

Shortly before Christmas the weather broke—for six crucial days. In the official records, this answer to General Patton's prayers is recorded as "the period of divine intervention."

On December 24, the 8th threw 2,200 heavies and 1,300 long range fighters into the tactical battle. With the 9th AF and 12th TAC, they raked and blasted practically every inch of the battle zone. When the weather asserted itself again after Christmas, our aircraft just kept on flying. The 8th operated on 12 straight days, a new record for winter operations.

The payoff came when our armies started overrunning Nazi tanks that were out of gas and capturing enemy soldiers who had not been fed for four or five days. At the turn of the New Year, the Luftwaffe desperately adopted our tactics. They came over in strength to shoot up our airfields. They did some damage but they lost more than 200 planes in these raids.

A few days later, General Spaatz expressed confidence that our offensive airpower is stronger than ever. In the near future, he predicted, the 8th would mount bombing missions numbering more than 3,000 heavies.

Aerial Evacuation

More than 700,000 sick and wounded men of American and other Allied forces have been evacuated by the AAF from battle areas since August, 1942, according to recent figures compiled by the Office of the Air Surgeon. More than 525,000, or 75 percent of the total, were evacuated in 1944 from European fronts, with the 9th and 12th Air Forces transporting the majority of the evacuees. Despite the large number of critically wounded men evacuated from France, Italy, Burma and the Central Pacific, the death rate has been very low—7 per 100,000 patients-trips. The number of patients evacuated by Air Transport Command from the theaters to the United States increased from 3,000 in 1943 to 30,000 in 1944.

Salvage of a B-29

Running low on fuel, a B-29 pilot set down his plane on an emergency strip in the CBI. Uncertain whether he was inside or outside the Japanese lines, he directed the crew to man all guns as he taxied down the runway. His plan was to run the length of the strip and then swing around, so that

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if ground troops attaeked he eould take off and fly as far toward friendly territory as his gasoline supply would allow.

Half-way down the dirt strip the Superfort hit a soft spot and the wheels sank into mud. Although it was determined that the field was in friendly territory, 20 miles from enemy lines, there appeared to be scant chance of salvaging the plane because of lack of fuel, tools, maintenance personnel and protection.

But after a representative of the Air Inspector's office visited the scene and sent recommendations and estimates back to headquarters, an epic task was performed. Chinese workers hauled in 4,500 railroad ties for repairing and lengthening the runway. Personnel adequate to tackle the maintenance job were flown in, together with supplies, including 182 drums of gasoline.

The project was rushed to completion despite intermittent rain and the added hindrance of Jap fighter attacks. AAF fighter patrols, protecting the field, shot down 30 enemy planes. And 13 days from the time the emergency landing was made, the big bomber took off and was successfully flown to safety.

Strategic Bombing Study

A civilian commission has been established by War Department order to move into Germany when military operations cease and appraise the effectiveness of strategic bombing on German industry. Work of the commission will be in addition to the surveys already begun by military observers in France, which will continue as Allied forces advance through the Reich. The commission is headed by Franklin D'Olier, industrialist and insurance executive.

New Bombing Tables

Air Ordnance has prepared new bombing tables, which are being published in a convenient 5½ by 8½-inch book designed for quick reference and ease of handling in a bombardier's compartment.

With a completely new format, the publication provides tables for each 100 feet of altitude. Additional information in the book includes special dropping angle tables for low altitudes, fictitious disc speeds when required, release lag tables for combination loadings and climb and glide data. All printing is luminous, to permit full use of the book at night. Copies are being distributed through regular channels by ATSC.

Air Crossroads

Tucked away in the green lowlands of Scotland is an international crossroads—an Air Transport Command station which is a terminal for most of the sky traffic between the United States and Europe.

It is a tremendous installation; you could spot half a dozen of America's biggest railroad terminals on the field and they'd hardly be noticed among the multitude of runways and dispersal and storage areas.

Hundreds of planes land there weekly and as many take off for the westbound run. For the past 18 months, a fleet of silvery

PLANE BONERS

Analyzed by Veteran Pilots

ENGLAND—A B-24 pilot was directed after landing to make a 180-degree turn and taxi back to a parking area. As he swung the plane around, the nosewheel and the right mainwheel ran off the strip. Attempting to force the wheels back on the runway, the pilot braked the wheels and applied power to the No. 3 and No. 4 engines, but the action was too severe and the nosewheel gear was sheared off as it struck the pavement.

Comment: Guilty first of faulty technique, which resulted in the wheels' leaving the runway, the pilot then showed poor judgment in trying to force the wheels from the soft ground. The sensible procedure would have been to have a tug pull the plane back on the strip.

TAMPA, FLA.—Cruising on a reconnaissance mission at 300 mph indicated airspeed, 40 inches manifold pressure and 2500 rpm, a P-51 pilot found his fuel was getting low. Although he reduced his power setting twice, he ran out of gas and was forced to land in an open field with resultant serious damage to the plane.

Comment: Recommended power settings are carefully determined. By drawing excess power, this pilot invited dry tanks.

GULFPORT, MISS.—As a B-17 entered the traffic pattern, its pilot ran through his checklist. He had just ordered the landing-gear lowered when the tower directed him to go around again. Calling for "flaps up," he circled once more, unaware that his copilot had retracted the wheels also. On the second approach, the pilot neglected to consult the checklist, the copilot failed to lower the gear and the plane landed "wheels up," with major damage resulting.

Comment: There was no excuse for this crack-up. Checklists are neither to be ignored nor lightly regarded. Furthermore, the error in landing-gear procedure would have been caught by a visual examination, which should have been made as an added precaution.

ENGLAND—Taking off, the pilot of a B-17G noticed halfway down the runway that no airspeed was indicated. He throttled back, but by that time the plane had gained so much speed it could not be stopped before the runway's end was reached and the bomber nosed over in the mud.

Comment: Investigation following the crash revealed the airspeed indicator had not functioned because the pitot tube covers had not been removed. Although this operation is the responsibility of the crew chief, the pilot is required to check to see that it has been performed.

NAVASOTA, TEXAS—After completing a low-level navigation mission, an AT-6 pilot reported that during the flight he had felt his plane hit something. Since he figured he was flying at 450 feet, he assumed he had struck a bird. He said he was uncertain, however, because he had been looking at maps when the impact occurred. The prop, cowling and radio mast were damaged, indicating the plane had gone through a wire.

Comment: A fine altitude at which to study maps!

MITCHEL FIELD, N. Y.—About to ferry a B-25 to Greenville (Miss.) Army Air Field, a pilot ran through his checklist from memory and then began his takeoff run. At an indicated airspeed of 90 mph, he tried to retract the nosewheel but couldn't budge it. Cutting power, he attempted to stop the plane but it ran off the runway and through a couple of fences.

Comment: If the take-off check had been completed properly, the pilot would have discovered that the automatic pilot was in operation and that its directional gyro and flight indicator were caged.

HILLSBOROUGH ARMY AIR FIELD, FLA.—Coming in for a landing, a P-51C bounced high in the air when its wheels hit the runway. The pilot attempted to make a three-point recovery but, discovering that the plane was drifting away from the strip, he decided to go around again. When he advanced the throttle, however, the left wing dug into the runway. The pilot was uninjured but the Mustang was wrecked.

Comment: The pilot's decision to go around again was a sound one. But he used poor judgment in applying power so suddenly that torque threw his wing into the ground. He should have considered that torque is particularly strong in a high-performance, single-engine fighter.

BARTOW, FLA.—During short field landing practice, a P-51 pilot realized he was likely to undershoot the strip. Trying to apply power and drag the plane in, he shoved the throttle forward but the engine only coughed and the Mustang crashed before reaching the runway. The pilot was injured slightly and the plane was demolished.

Comment: Aside from his error in undershooting, this pilot should have cleared his engine on approach. Quick response when power is applied often is the difference between life and death.

PREPARED BY THE OFFICE OF FLYING SAFETY.

NEW BOOKS
On Aviation Subjects

AT WAR

COMBAT IN THE AIR. *Maude O. Walters.* A collection of factual war narratives. APPLETON-CENTURY, N. Y.

FLIGHT TO EVERYWHERE. *Ivan Dmitri.* A photographic tribute to the Air Transport Command in both color and black and white. WHITTLESEY HOUSE, N. Y.

PRELUDE TO INVASION. *Henry L. Stimson.* Briefed official reports of the Secretary of War from December 11, 1941, to June 8, 1944. Many of them cover AAF combat activities. PUBLIC AFFAIRS PRESS, WASHINGTON.

THE AIR FORCES READER, Army and Navy Air Forces. *Norman Carlisle.* Extensive material on today's air combat elements. BOBBS-MERRILL, INDIANAPOLIS.

WAR IN MAPS, an Atlas of the New York Times Maps. *Francis Brown.* Third edition. OXFORD, N. Y.

HISTORY

FIGHTING WINGS, a Pictorial History of Aerial Combat in World Wars I and II. *Gilbert Paust* and *Milton Lancelot.* A survey of military aircraft development. DUELL, SLOAN AND PEARCE, N. Y.

TECHNICAL

AERODYNAMICS. *Leslie R. Parkinson.* Elementary flight theory with particular emphasis on high altitude operations. MACMILLAN, N. Y.

DESCRIPTIVE METEOROLOGY. *Hurd C. Willett.* The subject presented at college level. ACADEMIC PRESS, N. Y.

ELEMENTS OF ASTRONOMY. *Edward A. Fath.* Fourth edition. A standard textbook for students. MC GRAW-HILL, N. Y.

INSTRUMENT FLYING AND RADIO NAVIGATION. *Holland L. Redfield.* Simplified exposition of the basic elements involved in blind flight. RONALD, N. Y.

NAUTICAL MATHEMATICS AND MARINE NAVIGATION. *Sydney Walling* and others. Navigational computation methods. MACMILLAN, N. Y.

ROCKET RESEARCH, History and Handbook. *Constantin P. Lent.* A survey of the development and potentialities of rockets. PEN-INK PUBLISHING CO., N. Y.

POST-WAR

AN EDUCATIONAL GUIDE IN AIR TRANSPORTATION. *Ralph E. Hinkel* and *Leo Baron.* A collection of commercial aviation job description sheets outlining requirements and duties. TRANSCONTINENTAL AND WESTERN AIR, INC., KANSAS CITY, MO.

CIVIL AVIATION AND PEACE. *J. Parker Van Zandt.* A discussion of current proposals for future control of commercial aviation. BROOKINGS INSTITUTION, WASHINGTON.

These books are available to AAF personnel through the AAF Field Technical Library Service, which provides for technical libraries at all major installations. List compiled by the AAF headquarters library.

C-54s has been shuttling back and forth over the North Atlantic with clocklike regularity. The accident rate is negligible, the time of departure and arrival predictable within minutes.

During the same period more than 10,000 tactical aircraft, ready to take their place in the battle for Europe, have been ferried over the same route by the ATC.

Freight of vital importance moves swiftly through the Priorities and Traffic Office barely 18 hours after leaving New York. There are parts for planes or weapons, vital medical items, pieces of tactical equipment, supplies for guerrilla armies, propaganda leaflets to be dropped over enemy territory, luggage and bags of mail.

The huge station is the port of air evacuation to the States for the men wounded on the Continent. Many hundreds of specially-fitted transports have made this mercy trip.

Routine is the byword around the field. A trans-Atlantic plane attracts about as much notice as a British accent. After all, no one can get very excited about something that happens every few minutes. Perhaps the only eyes that watch an approaching or departing plane are those of a ground crew and the men in the control tower.

If you stand around the main passenger lounge long enough, you'll probably see any number of persons in the news headlines—ranking military men, cabinet members, diplomats and royalty. In the passenger dining room, you may be seated at a table with a couple of RAF men, a Polish charge d'affaires, a Bombay steamship line executive or some minor monarch from the Near East.

If the AAF has a Grand Central Station, this is it.

B-29 Transition Training

Transition instruction of airmen pointing for combat assignments as pilots or flight engineers of B-29s is now a function of the Training Command. Formerly it had been the responsibility of the 2nd Air Force.

The new program already is underway at Maxwell Field, Ala., in a four-engine school which previously gave graduate pilots transition training in B-24s. A school at Roswell Army Air Field, N.M., will be converted to B-29 training in mid-February and a third will be established at Randolph Field, Texas, in late spring.

Air Traffic Cops

The top of a tree in India, a wood platform with bamboo supports on Morotai, a thatched hut on Kwajalein, a peasant's cart on an airfield in France—these are "towers" from which AAF traffic controllers conduct their daily business.

As soon as a new field goes into action, the controller usually scrambles to the top of the highest elevation he can find that will hold him and his blinker light. The first control tower on Makin was a 50-foot palm tree that had been stripped of its branches and equipped with a tiny platform, just big enough to hold one man. There was a traffic controller at an airfield in North Africa who operated from a little house fashioned from packing boxes and mounted on 32 oil drums, arranged on two levels; a controller on New Guinea actually had his control "tower" in a trench.

Mobile control tower in England

When the traffic at an airfield becomes very heavy, the tower operator is often assisted by other traffic controllers who roam the flight line in mobile control units. Some airfields in France are using jeeps outfitted with transmitting equipment as mobile units, and vans with plexiglas blisters on their roofs (see cut and front cover) are used on some airfields in England to help handle a part of the heaviest air traffic concentration in the world.

The Mildew Campaign

Men who fly in the tropics or sub-tropics and are bothered by the musty odor of

mildew in their oxygen masks are advised by the Air Surgeon of a solution which acts as both a fungicide and deodorant. It is a mixture of one percent thymol in 70 percent ethyl alcohol. The mask should be scrubbed clean with brush and pure water, dried and then swabbed thoroughly with the thymol solution. After the mask is aired for half an hour, it is ready for use. The mixture imparts a clean, mild odor which lasts five or six hours.

Underground in Italy

The Italians used the caves as wine cellars. Then along came the Germans who found the caverns ideal for stabling horses and prisoners of war.

So when members of the 2nd Bombardment Group of the 15th Air Force moved to the vicinity and decided to use the caves as a recreation center, they were faced with the unpleasant task of removing debris and filth by the ton and executing a deodorizing campaign on a grand scale.

It took two months of spare-time labor to put the caves in shape but the results were worth the effort. The caverns now contain:

A theater which will hold an audience of 750. The auditorium was ventilated by blasting through 25 feet of rock. Cpl. Charles S. Ford, II, former Hollywood cameraman, puts on four movies and one complete stage show a week.

A gymnasium with handball courts, a boxing ring, basketball court and ping pong tables.

An excellent chapel. Maj. Ira B. Allen, chaplain of the bomb group, was one of the first to examine the caves and discover their potentialities.

A small broadcasting studio, offering daily musical programs, news and pertinent orders of the day through a public address system which reaches not only the "cave-dwellers" but every messhall, orderly room and squadron club at the nearby base.

The "Fortress Institute," which is nothing short of a small college. Under the direction of Cpl. Edmond B. White, an instructor in chemistry back in the States, the "institute" offers 15 different courses, including languages, meteorology, psychology and even art and bookkeeping.

A GI night club, complete with bar, stage, dance floor, and fancy tables and chairs made from bomb packing cases.

And what could be a better name for the establishment than "Rocky Fella Center" (the "y"-hating sign painter notwithstanding—see photo)? Sgt. Phil Reidy came up with that one and it stuck.

Busy as 'L' Aircraft

Recent official definition given the duties of liaison pilots reflects the all-round ability that the "little planes" and their pilots have displayed in every combat theater (see "Little Planes with a Big Punch," AIR FORCE, October, 1944).

Apart from miscellaneous missions "consistent with the limitations of liaison aircraft," AAF Regulation 35-27 (29 November 1944) points out, these flyers undertake artillery adjustment, reconnaissance and light photographic missions, troop and light cargo transport, aerial evacuation, column control, camouflage checking and wire-laying for communications. And when they aren't busy at something else, they act in courier, utility and ferry capacities.

Staff Course Terminated

The AAF Staff Officers course will be discontinued in February when the current class completes its training. Established in July, 1943, for the purpose of training superior young staff officers, the course has been completed by more than 600 students of the Command and General Staff School, Fort Leavenworth. In addition, they have received instruction at Wright and Patterson Fields, Navy installations at Norfolk, Va., headquarters of the Airborne and the Proving Ground Commands, Ports of Embarkation, the AAF School of Applied Tactics and the Convalescent Center and Redistribution Station at Miami and Miami Beach.

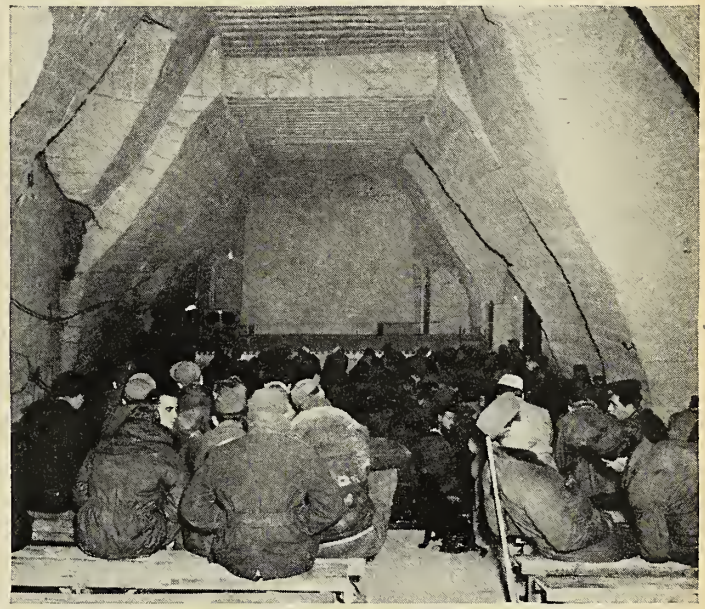
Topping a Quota

The 8th Air Force's Christmas Eve attack, which threw more than 3,000 bombers and fighters against the Von Rundstedt counter-offensive, gave the 357th Mustang Group the opportunity to achieve its goal of "500 by Christmas."

For several days previously, the 357th's bulletin board had recorded progress of the "500" drive, but on the morning of December 24 the score stood at 483 enemy planes—439 shot out of the air and 44 destroyed by ground strafing.

The group's chance came that afternoon over Kassel, Germany, where the Mustang pilots encountered a Nazi fighter formation. They knocked 31 Jerries out of the sky and boosted the 357th's mark to 514.

PWs and horses once entered here



This wine cellar now offers movies

The Winner

Weather forecasting honors go to M/Sgt. Herman J. Jordan. The sergeant was top man in a competition conducted by the AAF Weather Service among 100 domestic forecasters—and the race wasn't even close. Although the men behind him on the score tally rarely excelled their nearest competitor by more than a point or two, Sergeant Jordan led the runner-up by 240 points. Sergeant Jordan's clients at the Smyrna (Tenn.) Army Air Field should know what the weather score is, with no questions asked.

A War Diary

An idea of just how tough the AAF made it for the Nazis to maintain communications in occupied France is given by a "war diary" kept by the station agent at Maintenon, where two rail lines meet about 40 miles southwest of Paris.

The day-by-day record, discovered by an 8th Air Force officer who was investigating

TRAINING AIDS

Newly Standardized for Field Use

FILMS

OPERATION OF THE GLIDER PICK-UP BY THE C-47 (TF 1-3399)—The mechanism and method by which a Skytrain, without touching the ground, snatches a glider and lifts it into the air. Running time: 16 minutes.

FIFTY-HOUR INSPECTION OF THE B-29 (TF 1-3432)—A check-up of engines, propellers and nacelles. Running time: 55 minutes.

AN AVIATION ENGINEER AMPHIBIOUS OPERATION (TF 1-3440)—Day-by-day steps in the construction of an island airfield. Running time: 12 minutes.

ASSEMBLY AND INSTALLATION OF ROCKET LAUNCHER TYPE M-10 (FS 1-2001).

HARMONIZATION AND BORESIGHTING OF ROCKET LAUNCHER TYPE M-10 (FS 1-2002).

TESTING PROCEDURE OF ROCKET LAUNCHER TYPE M-10 (FS 1-2003)—A check-list covering the electric firing circuit, interval control and firing sequence.

IDENTIFICATION OF CLOUD FORMATIONS FROM THE AIR (FS 1-2007)—Various views of cloud formations. Intended to aid personnel to recognize major types while in flight.

PUBLICATIONS

GUNNERS' INFORMATION FILE (AF Manual No. 20)—Two latest supplements to the file are titled Gunnery in the B-29 and Harmonization in the B-29. The two also have been combined to form AF Manual No. 27. Distribution is limited to fields concerned with Superfortress gunnery.

THE UNIT GAS OFFICER AND GAS NON-COMMISSIONED OFFICER (AF Manual No. 50)—Defense techniques against enemy use of gas.

THE TROPICS — PERSONAL CARE, AIRCRAFT MAINTENANCE AND ELECTRONIC EQUIPMENT (ADTIC School Lecture T-11)—Measures by which personnel can avoid disease and by which equipment can be protected against climatic conditions in tropic areas.

AVAILABLE TRAINING AIDS FOR THE PERSONAL EQUIPMENT OFFICER—A list of films, publications, devices and graphics. Limited supply.

(Guides for Training Aids Officers, listed in this section of the January, 1945, issue of AIR FORCE, is officially designated AF Manual No. 22.—Ed.)

DEVICES

MODIFICATION OF C3-A SIGNAL LIGHT—A blinker apparatus, equipped with a 110-volt bulb and an AC plug instead of the usual 24-volt bulb and DC plug, thus permitting use of ordinary power supply. Approved for use in unit training only, the modified light can be seen both day and night and can be used by students for practice signalling across airfields. Scheduled for early issue.

GRAPHICS

CARDBOARD COCKPIT TRAINERS—Folding panels, used for instrument familiarization. In initial distribution in these models: B-17F, B-24J, B-29, C-46, C-54, P-38J, J-39Q, P-40F, P-40N, P-47D, P-51D and P-61B.

B-24 TECHNICAL CHARTS — Set of 41 sheets. Limited supply.

GENERAL ELECTRIC CENTRAL STATION FIRE CONTROL SYSTEM, MECHANICAL CONSTRUCTION, TECHNICAL CHARTS—Set of 35 sheets.

HOLLEY CARBURETOR, TYPE HB, TECHNICAL CHARTS—Limited Supply.

(The technical charts, listed above, were developed by the Air Technical Service Command and may be obtained through channels from that command's headquarters at Wright Field, Dayton, Ohio.)

RECOGNITION

RECOGNITION CATALOG—A list of all approved AAF recognition training aids, including appendix of stock numbers. Catalogs already have been shipped to headquarters of all overseas and domestic air forces for redistribution to recognition instructors.

Information on the availability of training aids listed in this column, unless otherwise indicated, may be obtained from the chief, Training Aids Division, Army Air Forces, One Park Avenue, New York 16, N. Y., upon request through channels.

the results of strafing and dive-bombing by P-38s, P-47s and P-51s, covered the period from June 1 to the day the Americans took the town. A condensed translation follows:

June 4—Locomotive strafed in station yard. A freight train about three kilometers away also was strafed by twin-tailed fighters.

June 6—Viaduct strafed and electric connections cut. Station and electric connection strafed.

June 12—Electric connections cut by strafing on all four lines. All traffic stopped for two days.

June 16—Traffic strafed on road near town.

June 18—Four aircraft strafed flat cars on out line of track. Cars and loads damaged.

June 20 — Approximately 24 fighters dropped 40 bombs, cutting tracks Numbers 2 and 4 in two places, track Number 3 in one place, destroying all electrical connections and all switching facilities for two kilometers. All traffic stopped for eight days.

June 22—Viaduct and station bombed by small number of planes that dropped 12 bombs. Station hit and viaduct cracked.

June 23—Train stopped on track near village strafed. Cars set on fire.

July 2—Strafed German trucks on road through town.

July 4—Two fighters strafed German anti-aircraft batteries located on viaduct.

July 23—Train strafed on track outside of town.

July 26—Strafed freight cars in station yard.

July 27—Fighters dropped bombs near station. No damage.

July 28—Flak batteries strafed. Results kept from civilians.

August 6—Station strafed.

August 10—The Americans arrived.

Lost Parachutes

No. 42-65417, seat type; return to F/O James B. Kiefer, T-4273, Malden Army Air Field, Malden, Mo.

No. 42-389533, seat type; return to Post Operations Officer, Midland Army Air Field, Midland, Texas.

Nos. 42-239727, 42-285076 and 42-371246, all S-1 seat type; return to the Commanding Officer, Merced Army Air Field, Merced, Calif.

No. 42-270662, seat type; return to Supply Officer, 72nd AAF Base Unit, West Annex, Porter Building, Kansas City 2, Mo.

Nos. 42-785425, 42-785684, 42-786118, 42-426590, 42-296019, 42-316443 and 42-277629, all seat types; return to Parachute Dept., Ellington Field, Texas.

Nos. 42-7500 and 42-5707, both seat type; return to Tech Supply Officer, 1378th AAF Base Unit, NAD-ATC, La Guardia Field, N. Y.

No. 42-146582, seat type; return, express collect, to 1st Lt. Charles A. Temple, 2124 AAF Base Unit Section B, Harlingen Army Air Field, Harlingen, Texas.

No. 43-16795, chest type; taken from Fairfax Field, Mo., on Nov. 6, 1944. Name Lt. T. D. Woods stenciled on pack and harness. Return to Capt. Thomas D.

"All honorable imperial fighter pilots will again intercept and destroy B-29s off Manila."

Woods, Jr., CNT Department, Headquarters, Army Air Field, McCook, Neb.

Nos. 42-192520, 42-210298, seat type; return to 78th AAF Supply Officer, Selman Field, Monroe, La.

Short Bursts

Smaller AAF stations which in the past have been visited infrequently by senior staff officers of AAF Headquarters will hereafter be included regularly on these officers' itineraries, under a recent order by General Arnold. . . . The Japs at Iwo Jima recently turned on the welcome lights for a 7th Air Force B-24 during a night attack on the enemy strip. The Lib approached the island from a northerly direction, having flown within 300 miles of Japan in search of enemy shipping, and the Japs apparently thought the plane was one of their own bombers coming in from Tokyo. The beacon and all landing lights along the strip were switched on, offering a perfect night target. . . . Members of one combat training crew at the Dyersburg (Tenn.) Army Air Field, practicing ditching technique with a mock-up B-17 mounted in a lake, have scrambled from the "plane" to their life rafts in 8.6 seconds, which they claim is some sort of a record. . . . In England during 1944, more than 30,000 AAF mechanics received specialized training in 147 special courses on aircraft maintenance. Prior to the invasion, 12,000 men attached to the 9th Air Force were given extra-curricular training in detection of mines and booby traps to enable them to clear captured airdromes as the Allied forces moved in. . . . The Office of Flying Safety is recommending that better judgment be used in the selection of sites for wind direction indicators. At one southern training base, the indicator was found to be giving erroneous readings because the wind was being deflected around a nearby grove of trees. . . . About four-fifths of New Zealand's bombers and fighters have been shifted from security duties in the South Pacific to combat duties with forces in the Southwest Pacific, Air Vice Marshal Lawrence M. Isitt, RNZAF Chief of Air Staff, reported recently. The bulk of the RNZAF aircraft had been employed in mopping up such planes as the Japs had left in the Bismarck-Bougainville area. . . . Since the introduction of body armor for combat aircrews, there has been a reduction of 58 percent in individuals wounded and 60 percent in wounds sustained. Effectiveness of body armor has been established through studies of this reduction in relation to battle damage to aircraft. . . . Of the 586 aircraft of the 8th Air Force reported missing immediately following attacks over Europe during November, 304 later turned up intact, most of them landing on airfields liberated by ground forces in France and Belgium. More than 120 had to be repaired before returning to England; others merely needed refueling. . . . A glossary of signs and symbols for use in photographic interpretation has been issued to all holders of the standard Photographic Interpretation Handbook. Entitled "Standard Symbols," this first supplement to the handbook was prepared by the Office of the Chief of Naval Operations in collaboration with G-2 and the Assistant Chief of Air Staff, Intelligence. . . . The Air Service Command of USSTAF in Europe estimates that paper work required for requisitioning and filling supply orders consumes 18 miles of paper every 24 hours, 6,570 miles a year. . . . Lt. James R. Spofford didn't know it at the time but the Jap Oscar he shot down over the central Philippines on December 1 marked something of a milestone in the history of the 13th Air Force. It was the 1,000th enemy plane destroyed by the 13th in action over three major Pacific theaters. . . . The 56th Fighter Group, top-scoring outfit in the 8th Air Force, celebrated its second anniversary in the ETO on January 6. Since its first operational mission on April 13, 1943, the group has destroyed more than 800 German planes. . . . Light, highly maneuverable C-64s which can operate from small, shell-pocked areas within gunshot of frontline action are flying ambulance relay service in France. Operated by the Air Service Command Transport Wing, they can carry three litter patients or five ambulatory evacuees.

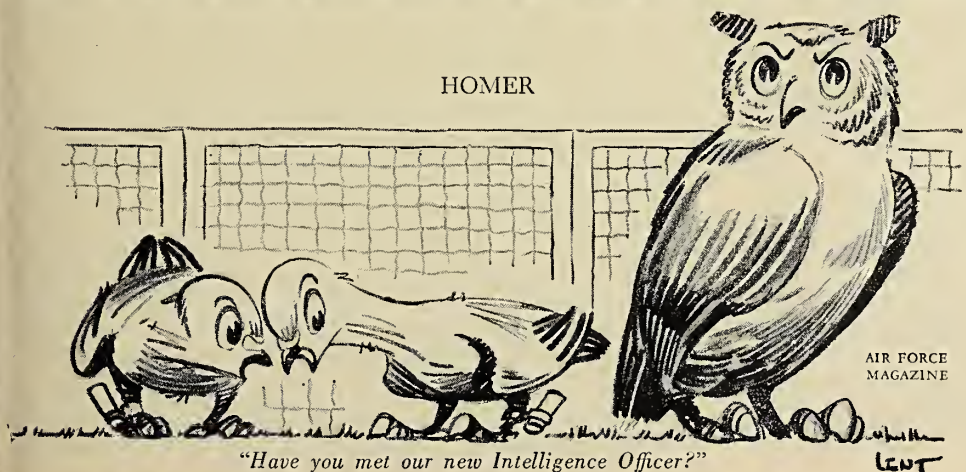
HOW SHARP ARE YOU?

QUESTIONS

1. Can you identify the airplane in the picture?
2. Is the propeller turning?
3. Does the airplane have a nose turret?
4. Is the windshield on the jeep up or down?
5. There is a fire extinguisher and a mirror on the jeep. True or false?
6. What are the last three numbers on the hood of the jeep?
7. How many men are clearly shown in the picture?
8. What is the rating of the man driving the jeep?
9. What does the other man in the jeep have in his right hand?
10. How many men are wearing hats?

ANSWERS ON PAGE 55

HOMER

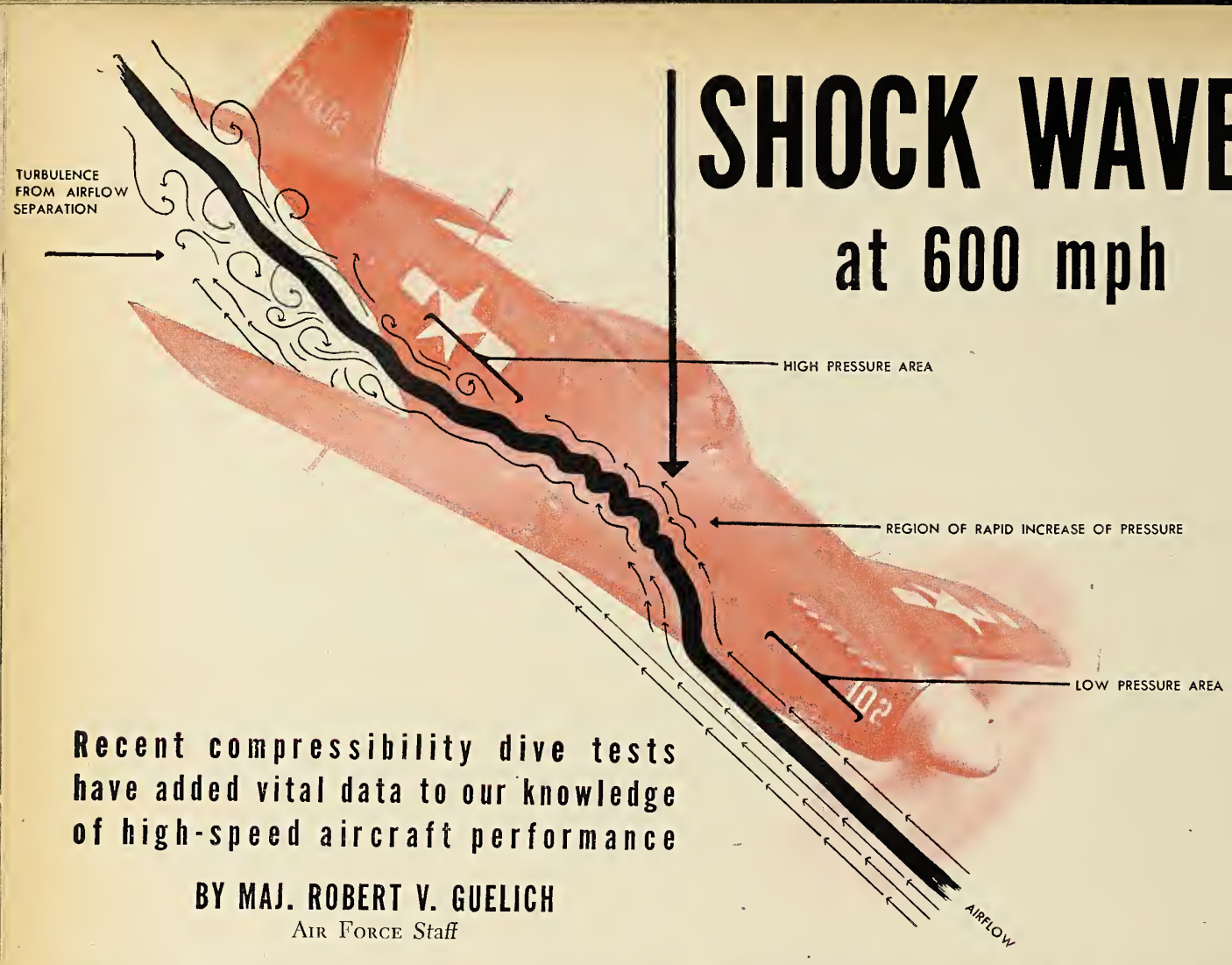


"Have you met our new Intelligence Officer?"

Why Not Contribute?

Whether they are short bursts or blockbusters, your suggestions for Cross Country items will be welcomed. Address your articles, comments and criticisms to Cross Country, AIR FORCE Editorial Office, One Park Avenue, New York 16, N. Y.

SHOCK WAVES at 600 mph



Recent compressibility dive tests have added vital data to our knowledge of high-speed aircraft performance

BY MAJ. ROBERT V. GUELICH
AIR FORCE Staff

The major had just made two high-speed compressibility dives from 40,000 feet in a P-51D and he was trying his best to convince a veteran colonel of what he had observed.

"You won't believe it, sir, but I saw it—a shock wave, on the wing. Yes, I know no one else has ever seen one so how can I prove it?"

Now, Maj. Fred Borsodi is a very enthusiastic pilot but he is reliable. His experience includes test flying for Pratt & Whitney and plenty of action as a P-40 pilot in the Mediterranean before returning to Wright Field.

But see a shock wave in a 600-mile-an-hour dive? To the colonel that was a little too much. He smiled benignly.

"Fred, these dives are pretty strenuous and you've been working mighty hard. You'd better take off for 10 days."

The 28-year-old pilot shook his head and left the office.

Ten days later, Major Borsodi was back in his flying clothes on the Wright Field flight line. In his plane was a newly-installed camera, aimed over the top surface of the wing. There were a lot of sly smiles and cocked eyebrows when he requested the camera but he was determined to get proof. No one could argue with a photograph.

The dives had become routine. At 40,000 feet he pushed the nose down and watched his airspeed. Too steep a dive might shake the plane apart. Rushing earthward at 10 miles a minute, the plane began to shudder as it ploughed through the air. Suddenly, the sun caught something on his wing, like a heat wave or a strip of cellophane from the fuselage toward the tip—the shock wave phenomenon. The wave moved back toward the trailing edge as speed increased then slowly moved forward and disappeared as the plane slowed down while coming out of the dive.

The motion picture camera had the proof to substantiate Major Borsodi's "wild" claims. He was the first man to see a compressibility shock wave on an airplane wing, and he now had pictures to prove it.

Visual discovery of the shock wave was accidental in that the purpose of the series of 32 compressibility dives flown by Major Borsodi was to determine stability characteristics of the P-51D at high Mach Numbers (Mach number being the quotient of the plane's true airspeed divided by the speed of sound), and establish a safe Mach Number limit which should not be exceeded by other pilots.

Not satisfied when he learned that compressibility began to make the plane shudder and shake at a Mach Number of .76, Borsodi continued his tests until he reached .86 when the coolant radiator, oil cooler and hydraulic lines cracked from the intense vibrations. At this Mach Number, he was flying at a true airspeed of approximately 640 mph—believed to be the fastest instrumented flight ever made.

His dives revealed that a pilot can encounter the effects of compressibility (usually first noticeable as vibrations or tail buffeting) and safely slow down his plane, and that the greatest danger lies in rapid pull-outs from dives in which high acceleration forces (G) will rip off wings and tail.

By trimming the P-51D nose heavy, prior to entering the high-speed dive, Borsodi was able to keep his plane under control at all times. Tendency of the plane to porpoise during the dive was prevented by holding the control stick firmly; efforts to compensate for porpoising only intensified the danger.

The shock wave encountered in high-speed dives at high altitudes is a thin layer of air in which there is a very rapid increase of pressure. It forms only when air passes over a

surface, such as an airfoil, at or in excess of 1,100 feet per second at sea level conditions (760 mph), which is also the speed of sound. The speed range in which a shock wave is formed is known as the compressibility region.

Although shock waves, similar to bow waves on a boat, will form at or in front of the nose of any object moving at speeds greater than the speed of sound, they also can form at the thickest part of the wing or at a wing-fuselage junction on an airplane moving at subsonic speeds provided the airplane Mach number is high enough. In such cases, although the airplane is passing through the air at less than the speed of sound, air flowing over the curved top of the wing may exceed sonic speed, thereby creating the conditions required for formation of a shock wave.

When a shock wave is produced, the air separates from the surface of the wing instead of flowing smoothly over it. (See Diagram.) If this turbulent air strikes the tail, it will cause buffeting of the control surfaces, particularly, the elevator. Most pilots are familiar with tail buffeting, which occurs in high-G turns and pull-outs. Compressibility tail buffeting, however, may occur in a straight dive at less than one G, and becomes more severe as the Gs are increased.

With the formation of a shock wave on the wing, the lift on the wing will be greatly decreased. This will affect the stability of the plane, shift the center of gravity to a far-forward position, make pull-outs difficult.

Compressibility dives by pilots of P-47s and P-38s have revealed some tendencies for these planes to nose under as diving speed increases.

Here are some general effects of compressibility on P-38s, P-47s and P-51s, based on Wright Field and Orlando tests.

P-38: Buffeting of the horizontal tail surfaces followed by loss of elevator control and occasional tendencies of the plane to be extremely nose heavy. At the first evidence of buffeting, the pilot should flatten his dive angle.

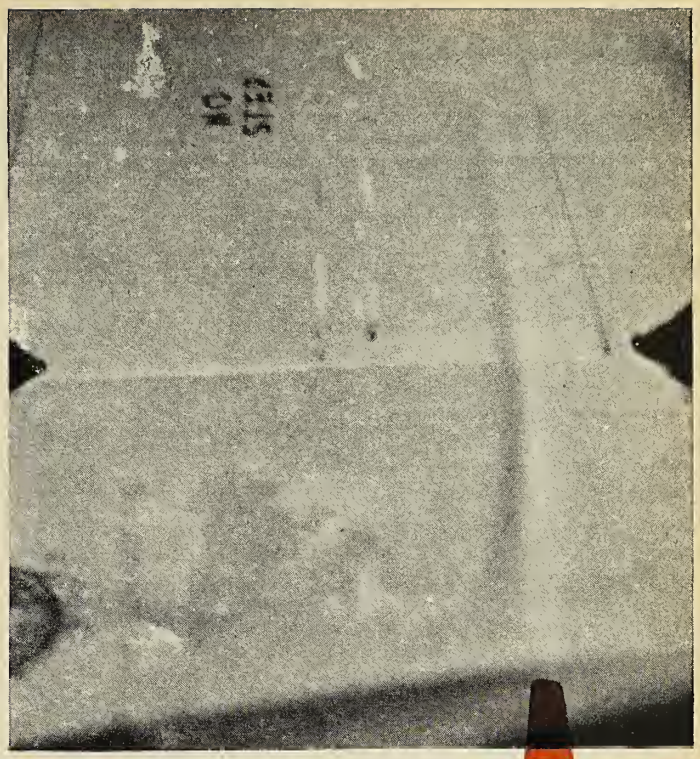
P-47: Buffeting of the horizontal tail surfaces and almost simultaneous "freezing" of the stick (requiring near-superhuman force to pull out), increase in stability, tendency to be nose heavy, and reversal of stick force. When such phenomena are encountered, the pilot should not reduce power since this will tend to put the plane in a steeper dive. No change should be made in elevator trim during the dive. Gentle pull-out should be started between 18,000 and 15,000 feet; the airplane will recover with strong steady back pressure on the stick until the elevators become effective.

P-51: Vibrations and tail buffeting followed by porpoising tendency, slight heaviness of the ailerons and tail. Tail heaviness should be trimmed out, the stick should be held as nearly stationary as possible. Cutting power seems to have little effect, but it helps in reducing speed.

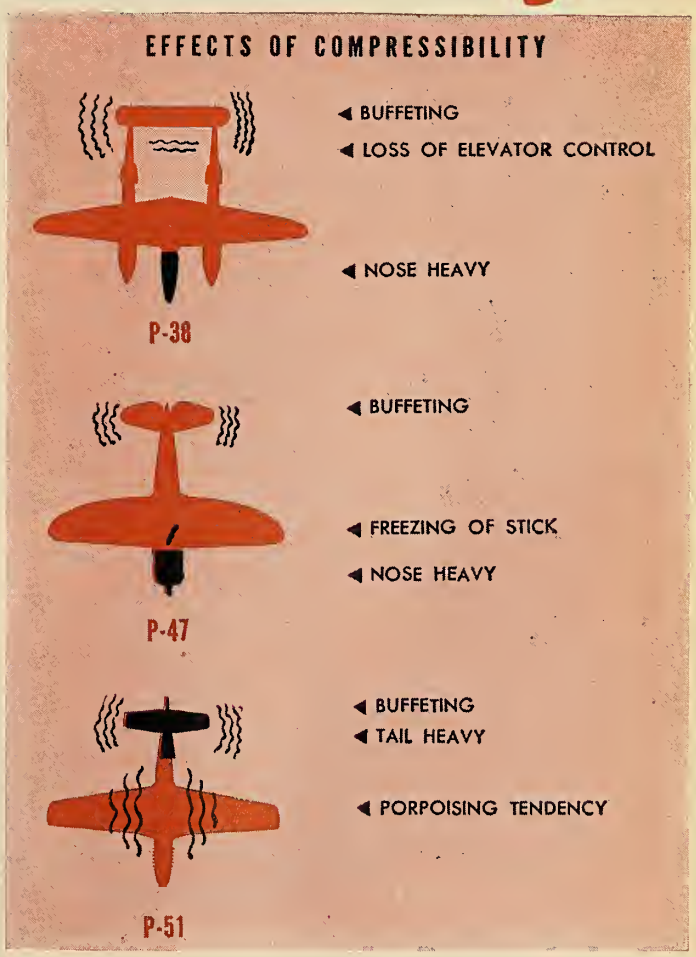
From the AAF Board at Orlando, following a series of compressibility dives with high performance fighter aircraft come the following recommendations:

To avoid compressibility—(1) Do not exceed airspeeds corresponding to three-fourths the speed of sound at the altitude at which dives or maneuvers are to be carried out. (2) Avoid violent use of ailerons. (3) Never roll into a vertical dive above 30,000 feet. In this attitude, speed may increase so rapidly that the critical speed may be involuntarily exceeded. (4) At high speed at altitude, use controls gently as if the airplane were near a stall. Do not be in too much of a hurry to recover from a dive because high G forces will cause entry into the compressibility range above 20,000 feet and much more easily than below 20,000 feet.

Major Borsodi's reports on controllability and behavior of the P-51D in high-speed dives have provided the basis for a new series of compressibility dive tests at Wright Field. From these tests it may be possible to determine safe Mach numbers for each type of high performance aircraft. ☆

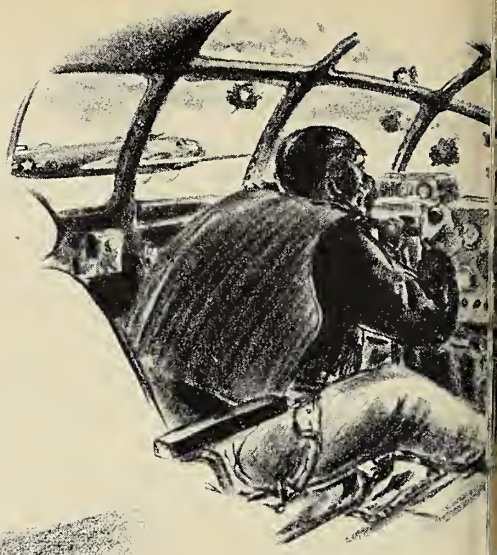


Shock wave developed on wing of a P-51D during compressibility dive. Silhouette at right shows the section of the wing that was photographed.



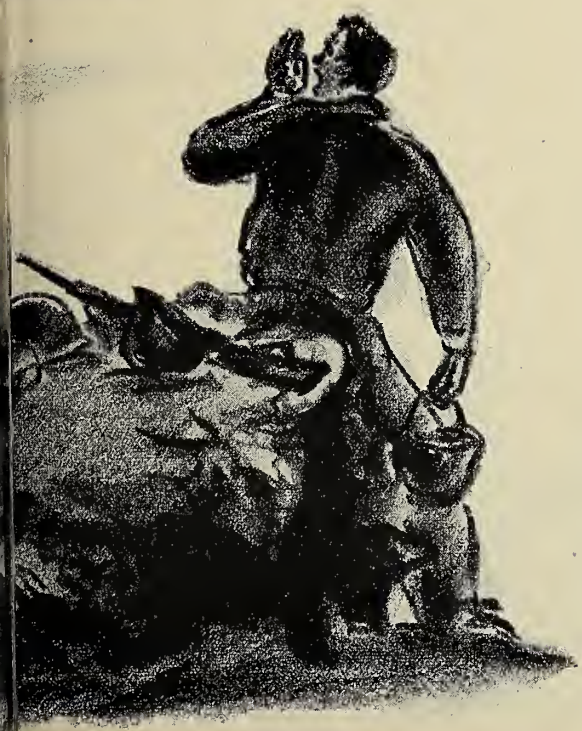
ROUND TRIP TO TOKYO

Captain Raymond Creekmore, AIR FORCE Staff Artist, took his sketch-book on the first B-29 strike against the Jap capital. Here are some scenes from that memorable mission



Ground crews cheer as the first Superfort lifts a tremendous load of gasoline and bombs from the runway at Saipan—

t is minus 28 degrees
utside the plane - but
ur pilot is soaking
et with good honest
weat as we plough
nto the flak —



Central fire control is making life miserable for Jap fighters - This gunner has an unobstructed view around 360 degrees of the horizon —

Our side gunner keeps an eye on fighters coming up as bombs fall from the planes in our formation —

ANTIAIRCRAFT... PARTNER OF THE AAF

BY CAPT. JOSEPH D. GUESS
AIR FORCE *Staff*

"Flak at 12 o'clock close"—that old interphone cry—has caused many American airmen to curse the accuracy of enemy fire and wonder just how well our own antiaircraft gunners can hand it back.

Twenty-five thousand feet over an invasion beach, one B-17 crew got a plain, short answer to that question. This Fortress flew ahead of the others to drop pamphlets telling civilians to scram. Not recognizing the lone plane, an American gun crew about to land took a warning shot. The single shell exploded close enough to crack the plane's windshield.

Antiaircraft and the Army Air Forces, in their mutual fight against the airborne enemy, have reached a coordination that really works. Antiaircraft's development in equipment and personnel has kept pace with that of the AAF and combat records tell an impressive story.

In France ack-ack gunners in one 31-day period destroyed or damaged 38 percent of all enemy aircraft that dared fly over the First U. S. Army's zone of action. Nine percent of the total were definitely destroyed and five percent probably destroyed. During a 20-day period AA sharpshooters deadpigeoned 105 enemy aircraft, and probably got another 93 planes. Then, on one September day, things really got cracking. Our ack-ack blew up 21 of 33 German planes sent into the First Army's area; a single battery claimed four FW-190s in four minutes. Near Paris one night the enemy dropped flares and then got trapped in his own light. A battalion of 40 mm guns downed 21 Huns in 15 heated minutes.

A few years ago AA personnel numbered but a few thousand men; today they are several hundred thousand. AA is entirely separate in organization from all other branches of artillery and, under Army Ground Forces, has a command of its own headed by Maj. Gen. Joseph A. Green. There are four large AA training camps in the United States.

To promote AAF—AA cooperation from the top commands to the gunners on the ground and the planes at the front, General Arnold has set up an antiaircraft office in Headquarters, AAF, and named Maj. Gen. Homer R. Oldfield, veteran artilleryman, to head it as Special Assistant for Antiaircraft. More than 75,000 AA enlisted men and officers have been obtained from the Antiaircraft Command and specially trained under AAF direction for AA assignments directly with the AAF. These men are available for assignment to overseas air commands and from the latter go to air divisions, to wings and finally to group bases.

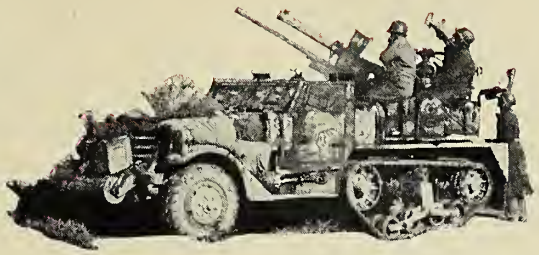
General Oldfield's office also helps formulate overall policies for joint efforts of AAF and AA on the battlefield. In some operations in France and in the Pacific, our aircraft have taken over the fight against the aerial enemy by day, and antiaircraft has had the whole job—along with Signal Corps warning systems—at night.

American AA gunners aiding the British in England shot down in August and September more than 50 percent of the enemy's robots within range. Nor has the skill of our AA men been overcome by the phenomenal speed of jet propelled aircraft. They are scoring with increasing frequency against German jet fighters.

Such shooting calls for quick fingers, sure eyes, and a steady head. Delicate and exceedingly fast computation is necessary when a gunner must aim, as he often has to, four

American soldiers man multiple 20 mm flak gun captured from the enemy at Paestum, Italy. This weapon is capable of being swung in a wide arc and used as antitank gun as well as antiaircraft.

Our ack-ack gunners share with us the responsibility for destroying enemy airpower



miles ahead of his quarry if he expects the speeding plane and his shell burst to reach the same point at the same time.

Antiaircraft claims fall into two classes. Destroyed planes are classified as Category I, and must have been seen to crash, and their wreckage found afterward. Probables, or Category II claims, are made for severely damaged planes verified by several witnesses. Antiaircraft's record, like its shooting, is accurate.

But a price of blood has been paid for this record. One battalion, landing on a French beach with the first infantry assault waves, came under direct enemy artillery fire and lost 300 men and 15 officers. Yet it set up antiaircraft defenses for other incoming troops.

Our AA crews have been on the job longer in Italy, and often with excellent hunting. At the Anzio beachhead, a world's record was established for AA concentration—surpassing in accuracy and quantity the German flak over Cassino or any German homeland target. Fifty Army ack-ack men destroyed 462 planes, nearly a tenth of the number involved in 635 air attacks. Another six percent were probably destroyed. One night ack-ack aimers, with a well-rounded use of searchlights and guns, destroyed five out of 12 German planes—and fired only 178 shells.

This record of 178 shells is even more striking when it is recalled that to destroy one enemy plane during London's early blitzes an average of 3,000 shells was needed. Other instances are as exceptional.

A United States ack-ack crew in India found itself in combat recently before it had finished digging into position at a new field. It knocked down one Jap bomber and one fighter. Having taken a five-minute break for this purpose, the crew settled back to digging.

When another field in the CBI theater was under attack, an AA crew forced the enemy's fighters and fighter-bombers to turn aside from their runs toward the hangars and parked aircraft. The Japs became so annoyed that they abandoned their main purpose and concentrated on strafing this single gun crew. That didn't pay either. The gunners blew up two Jap planes before the rest decided to run home.

In North Africa, the Air Force so sliced down the enemy's airpower that comparatively few target planes reached our lines where antiaircraft was set up. When antiaircraftmen became bored with the inactivity, they were put alongside heavy artillery and told to blast away at targets on the ground. This had good effect also in Italy, later.

But whether firing at the Hun in the air, or blasting him on the ground, the AA crews gave him no quarter. The combat soldier usually can distinguish sounds of oncoming artillery shells and has a split second to flatten out or take cover; but the high velocity and flat trajectory of ack-ack guns pulled up to close range give the enemy no warning.

Antiaircraft alongside heavier artillery has eliminated scores of thick concrete pill boxes and other obstacles in France. At Cherbourg several AA men were concealed around a German fort. When some of the Germans tried to escape, gunners cut them down. The remaining personnel of the fort, 120 men and five officers, surrendered to two antiaircraft GIs.

An unprecedented use of antiaircraft set off an Allied advance in Italy. Our AA weapons were brought close to the front lines and directed in counter-battery fire against powerful concentrations of the enemy AA guns. This was fighting flak with flak. Our fire was so well-timed and effective that immediately afterward a large number of AAF aircraft, including the heavy bombers, strafed the enemy from the deck without loss of a plane.

Research and scientific testing on the battle front, as well as in the interior, has resulted in superior predicting and detecting mechanisms and guns. The 50 cal. machine gun, specially souped up, has stopped many low-flying airplanes, as had the 40 mm automatic weapon with a maximum effective range of 2,500 yards, and a firing rate of a round a second. Outstanding is the record of the 90 mm gun which reaches to 30,000 feet and fires twenty 42-pound shells a minute, each shell having an effective bursting radius of 60 to 100 feet.

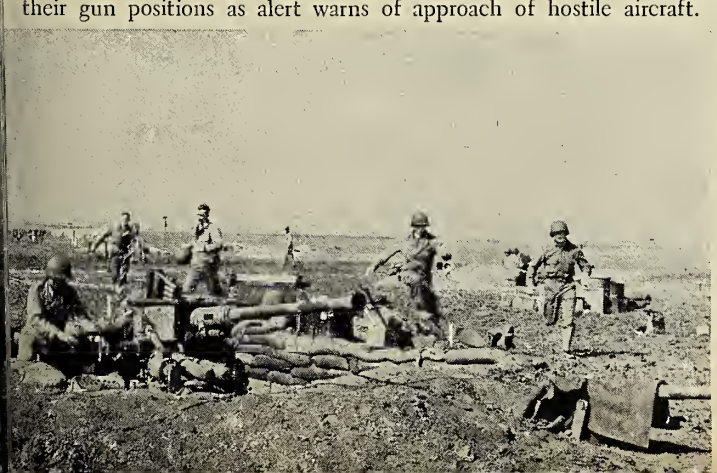
A mammoth in size and potency is the 120 mm gun, the United States' largest antiaircraft weapon. It fires 10 to 15 rounds of 102-pound shells a minute. The gun weighs 31 tons and is semi-mobile.

Most impressive development is the unplanned, spontaneous cooperation between AAF and AA, like the method devised on the spur of a precarious moment by one P-40 pilot.

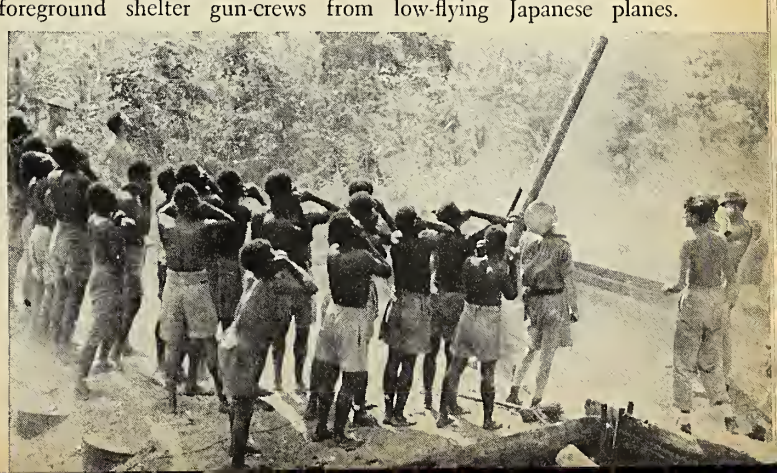
He had tangled near his base with three Zeros and had shot down one, but his plane had been badly damaged. The remaining two Zeros were hot on his tail, and he couldn't shake them. Playing a hunch, he buzzed a nearby antiaircraft crew which obligingly blew the two Zeros to pieces. The P-40 pilot landed safely.

He had learned why antiaircraft has become the AAF's trusted teammate. ☆

Somewhere in North Africa men of an antiaircraft regiment rush to their gun positions as alert warns of approach of hostile aircraft.

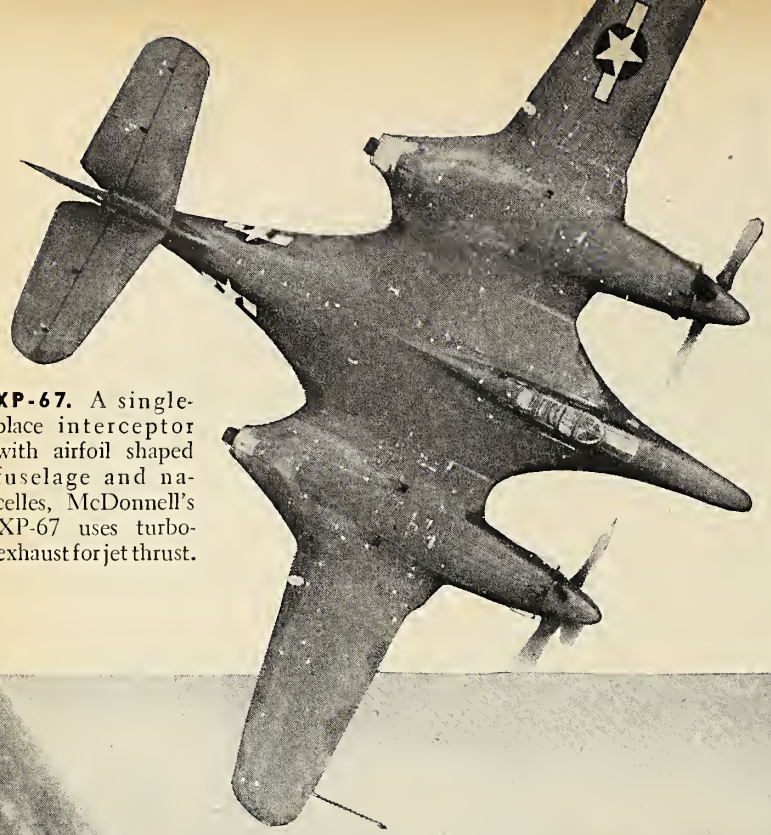


Natives on Guadalcanal get set for the big bang. Pits in right foreground shelter gun-crews from low-flying Japanese planes.



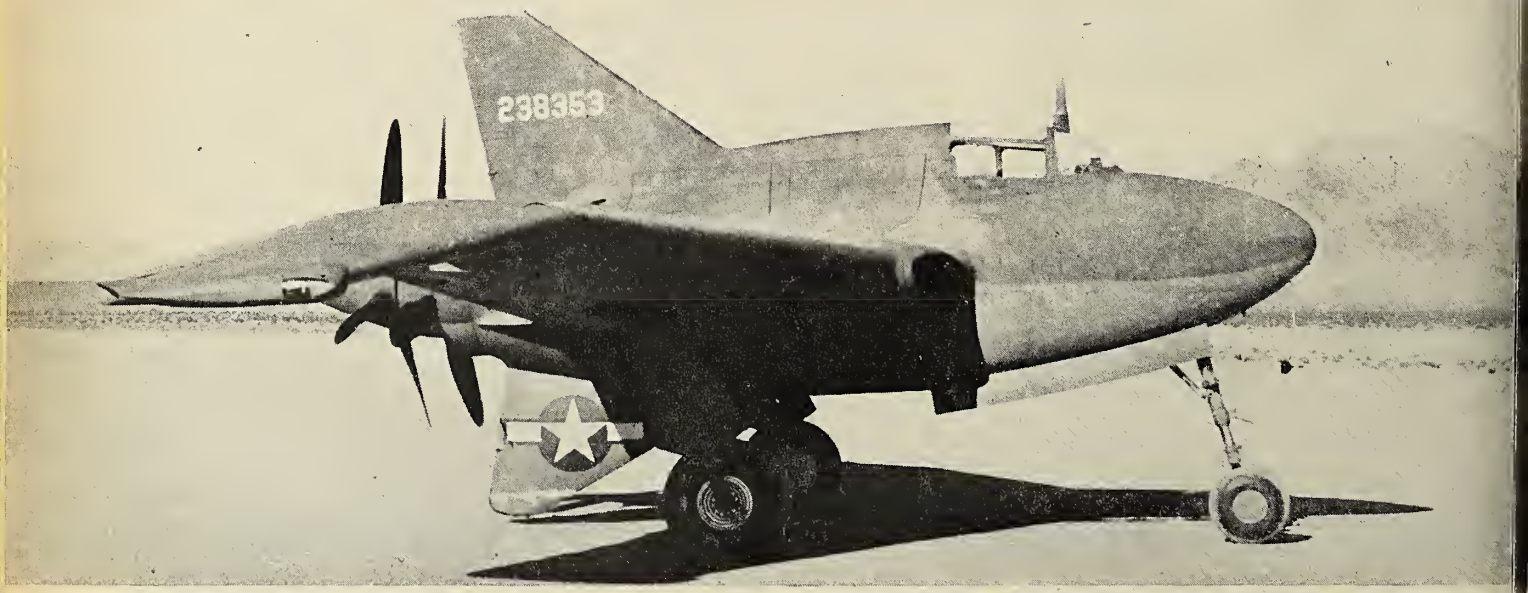
fighter fashions

These extremist fighter designs are AAF engineering test planes, born of war. They will never see combat, nor are they prototypes of future fighters. They are winged classrooms which are contributing to AAF warplane development.



XP-67. A single-place interceptor with airfoil shaped fuselage and nacelles, McDonnell's XP-67 uses turbo-exhaust for jet thrust.

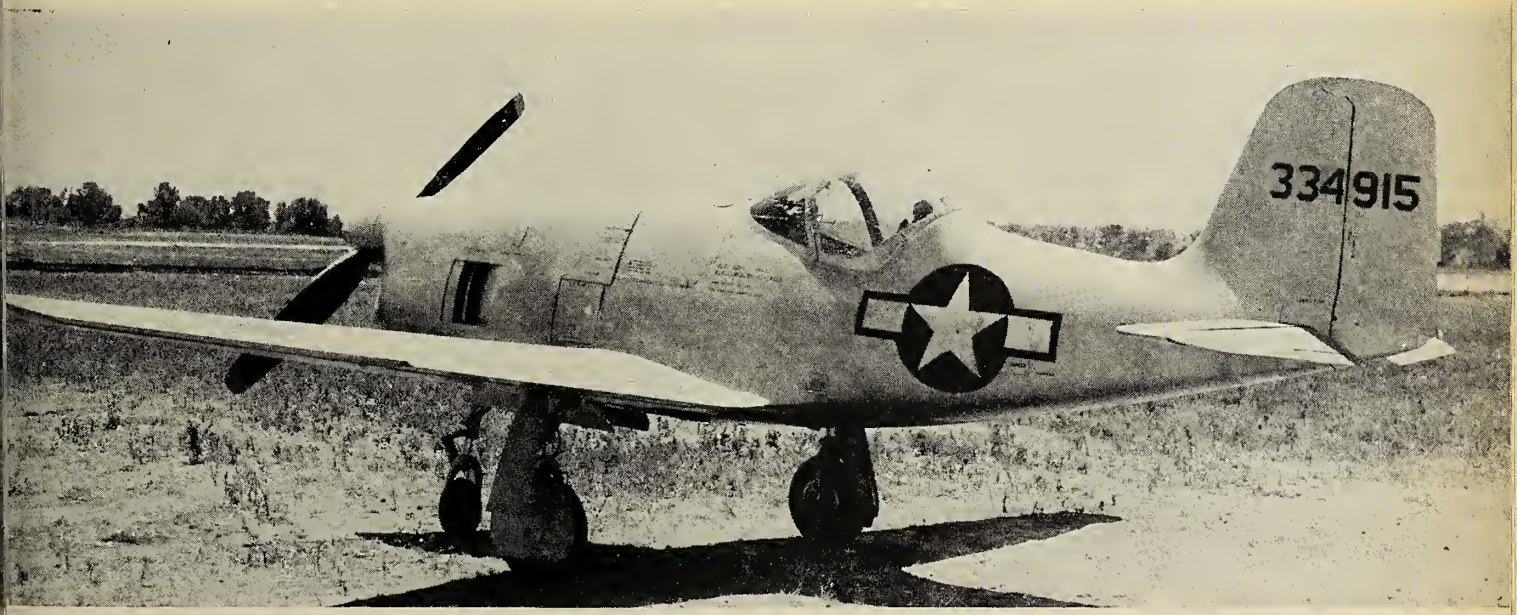
XP-75. Intended as a composite airplane, the XP-75 was to use assembly parts already in production for other aircraft. It was to have P-40 wings, F4U landing gear, A-24 tail, but the finished product emerged as a completely new design, long and slender with an extremely thin airfoil and peculiar rudder shape. Allison 3,000 hp engine drives twin co-axial counter-rotating propellers.



XP-56. Dumbo of the AAF's test-tube warplanes is Northrop's stubby XP-56, flying wing with engine weight concentrated on wing's mid-section. The fuselage is an elongated engine nacelle. Radial engine drives two three-bladed counter-rotating pusher-type props. Elevator and lateral controls are at wing tips. Fixed vertical fins above and below the fuselage give the XP-56 sausage-like profile.

XP-55. Embodying some of the control principles of the flying wing, the Curtiss XP-55 has elevator controls in the extreme nose. Minus conventional rudder, the plane has vertical stabilizers near tips of its sweptback wing to aid directional control. Allison "1710" engine is mounted in rear, thereby permitting use of forward firing armament installations balanced by weight of engine.

XP-54. First AAF pusher-type fighter since the twin-engined Bell XFM-1, Vultee's twin-boomed, bullet-shaped XP-54 introduced a low drag airfoil section, was one of the first planes to have flush-riveted "fender finish" skin, features designed to cut down on drag forces. Called the "Swoose Goose" because of its inverted gull wing, it has a four-bladed prop driven by Lycoming inline engine.



XP-77. Only all-wood AAF fighter of the war, the Bell XP-77 was built when metal shortage loomed critical. Hollow propeller shaft permits use of single forward-firing cannon. Powered with inline Ranger V-770 engine, the XP-77 uses small, two-bladed metal prop with large spinner hub. Speedy and maneuverable, it was designed for possible use against sharp-turning Japanese Zeros.

The Bridge Busters, using the "Erdin" method, knock three spans of the Daga Bridge into the drink with a train of 1,000-pounders released from 300 feet. In 10 months, this low-level, nose-down type of attack accounted for destruction of nearly 100 Burma bridges.

Burma Bridge Busters

BY T/SGT. RICHARD M. POWERS

Air Force Staff

It might be said that the "Burma Bridge Busters," as the flyers of the 10th Air Force's 490th Medium Bombardment Squadron are known, owe much of their success to a tree—the one that got in the way of Maj. Robert A. Erdin's B-25 just as he was about to drop a load of 1,000-pounders on the Mu River Bridge, New Year's Day, 1944.

Roaring in at very low level for the attack on this important link in the Burma Railway, Major Erdin had to gun his bomber to avoid hitting the tree which loomed unexpectedly in his course. By the time he could get the Mitchell back to the predetermined altitude of attack, he was already on the target and was forced to release his bombs while the plane was still nosed downward in a shallow dive.

Photos revealed the devastating effect of the well-placed, delayed-action missiles. The bridge had been demolished. But of even more importance was Major Erdin's chance discovery of what he and other pilots in his outfit had been seeking for two months: the technique by which the "skip" could be eliminated from low-level bombing—the technique by which the 490th was to account for most of the 99 other bridges it was to destroy in the next 10 months.

Back in November, 1943, the squadron had turned its attention to blasting bridges on the Jap main lines of communications in Burma, after being engaged for nearly a year in knocking out enemy railway junctions, supply trains, river shipping and troop concentrations.

Scant success had greeted the outfit's early operations in its new assignment. Its initial mission was against the Myittha Bridge, vital trestle in the rail line connecting Rangoon with the Burma Road. The attack, made at conventional medium altitude, proved to be a flop. The bridge approaches and the area immediately surrounding them were blanketed by bomb bursts, but the structure itself was undamaged.

Thus convinced that medium-level bombing would be ineffective upon most bridges of the type found in Burma, Lt. Col. Robert D. McCarten, squadron commander at that time, tried low-level skip-bombing. The bombs were dropped with bullseye accuracy, but the method employed proved to be too aptly named. The bombs were skipping, all right; they were skipping the targets. Some skipped over and some under the bridges, while others landed on the spans only to ricochet to the shores where they exploded with little or no tactical effect.

It was while the squadron was seeking an efficient low-level technique that Major Erdin, then squadron operations officer and now commander, hit upon the solution by his New Year's Day lucky discovery that a shallow dive just prior to release would plummet the bombs earthward at an angle that would prevent them from bouncing upon impact.

Experimenting during the next few days with his innovation, Major Erdin found its effectiveness could be improved by dropping the bombs while the plane was flying parallel to the structure being attacked. Previous squadron procedure had been to approach a bridge at a slight angle and drop the bombs in train at short interval.

By January 15, the entire squadron had been drilled to perfection in the new low-level, shallow-dive, parallel-release style of attack and was ready to use it in combat. It was only natural that Colonel McCarten should choose the still-standing Myittha Bridge as the first enemy objective to taste the effectiveness of the Erdin plan.

To Lt. Andrew J. Boutselis went the satisfaction of delivering the telling blows to the narrow, 280-foot rail bridge. After bombs from two preceding planes had softened up

the target, he slid two eggs into the trestle near its center, ruining the structure. Only the north span remained standing, and photos showed it was badly out of line.

The bombs which turned the trick were the same as those used by Major Erdin against the Mu River Bridge—general purpose 1,000-pounders, fuzed for 8 to 11-second delayed action. Lieutenant Boutselis said that at the point of release his altitude was 250 feet, his angle of dive, approximately 20 degrees, and his indicated airspeed, 280 mph.

From that day, things went well with the 490th. During the next 10 months, the "Busters" destroyed 98 more bridges and damaged 44 others. Their best score was registered April 10 when they knocked out six key bridges on the railroad between Mandalay and Rangoon, effectively paralyzing all movement over that line. By razing the Bawgyo Bridge on November 8, they boosted their score to 100.

"It has been our experience," Major Erdin explains, "that in attacking targets which do not present a massive vertical surface sufficient to stop the terrific forward motion of the bomb, a shallow dive must be employed. And when ground defenses permit, a run at 300 feet above the target is even better."

The Meza Bridge was a typical example of the targets against which the 300-foot, maintained-altitude method of attack was used with great success. Major Erdin was flight leader the day that rail trestle over the Meza River was smashed. Here is a portion of his version of the mission:

"After crossing the Chin Hills at an altitude of 14,000 feet, we let down at 500 feet a minute, arriving just south of the target at an altitude of 1,000 feet. The three planes were in V-formation. Direction of the attack was to be from east to west since a long stretch of the railroad led straight to the bridge, affording an excellent opportunity to kill any drift on the bombing run.

"The moment the target came into view, I gave a visual signal to the left wing plane, which peeled off to the left, circled to the east and made its planned two runs.

"During the few minutes consumed by the first attacks, the right wing plane and mine circled the target at about 750 feet in a Luftberry pattern. This put us in a position to observe results and gave the photographer an opportunity to secure excellent shots of the result of each run.

"I made the second run the moment the atmosphere cleared and the left wing plane climbed to 750 feet and circled. This same procedure was followed by the right wing plane. The moment photographs had been taken after the last run, we headed home."

In 101 bridge-busting missions, the 490th expended more than 1,000 tons of bombs, releasing 13 two thousand-pounders, 1,556 thousand-pounders, 784 five hundred-pounders, 33 two hundred and fifty-pounders and 240 hundred-pounders. Sowing the smaller delayed-action bombs after an attack is SOP with the "Busters."

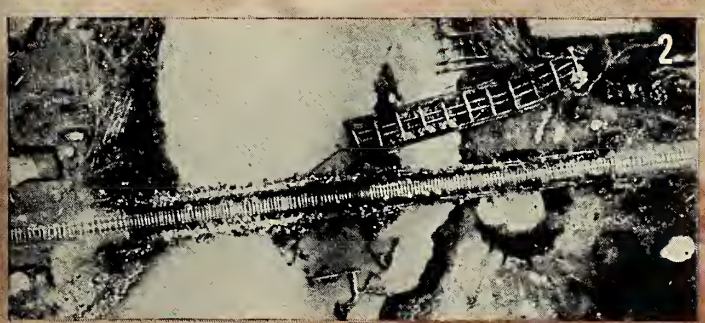
The squadron finds its chief delight in the cat and mouse game of blasting a bridge, allowing the enemy to rebuild it nearly to the point of serviceability and then returning to crack it up all over again.

As one bombardier puts it, "We must be driving the Japs out of their minds. And that's only preliminary to driving them out of Burma." ☆

This 10th Air Force B-25 squadron can match records with any outfit in the AAF when it comes to wrecking enemy communications

Mitchells of the 490th play cat and mouse with the Wuntho Rail Bridge. In photo 1, Lt. Herbert Schwarz has snapped the bridge in two by smacking it dead-center with 1,000-pounders. Photo 2, taken two weeks later, shows that the Japs have completely rebuilt the bridge, the old span lying next to the new structure. In photo 3, Lt. C. F. Powell has shattered the new bridge with 500-pounders, thereby again delaying Jap supplies over Rangoon-Myitkyina line.

1



Mission to Balikpapan

BY LT. RICHARD S. REYNOLDS

Bombardier, 13th Air Force

ILLUSTRATED BY CPL. LOUIS S. GLANZMAN

A kind of shiver runs through me when I hear that the target is Balikpapan, and I can feel it again when the briefing officer says we will be on our own. The distance is too great for the fighters.

On the way to the line, I'm thinking about the target, Balikpapan. They told us in the operations tent that this will be a big one. It supplies 15 percent of Japan's total aviation gasoline and oil. We are in for some fun, the Japs are sure to have plenty of stuff around a target like that.

We reach our B-24—"Burma" we call her, for that lovely comic strip character—and check over our equipment and supplies. M/Sgt. Kurt Patzlaff, our crew chief, stands by, ready to defend his baby should we find some little thing wrong. We don't.

A brilliant October moon shines down, and I sit on the wing and write our load list by moonlight. Everything's set and on signal from the tower we taxi out on the runway.

Tonight it's the Number 1 position in our squadron for us. Three other squadrons already have taken off. We are

"I try to get in on the interphone but our copilot is screaming to our ball turret gunner."

Here's what it's like to fly 16 hours unescorted against one of the toughest targets in the Southwest Pacific. Here's what it's like to fly into a Japanese hornets' nest and out again

one of 76 tonight. A lot of bombs are on their way to Borneo.

I take my position in the well, forward of the bomb bays, to salvo our 250-pounders in case we lose an engine on take-off. I stand there feeling a little miserable. I have had only two hours' sleep and that's precious little when you are facing a 16-hour non-stop mission with an interlude over a rough target.

But now, Burma is roaring down the runway, and she lifts her heavy load of gasoline and bombs into the air. As we gain altitude, I look down on our runway lights. They will go off and then on again before we return.

I stand with my head in the transparent bubble on the roof of the plane, breathing oxygen through a mask. The cloud banks give me a sense of loneliness, as if Burma and the 10 men inside her are flying this mission to Balikpapan alone. Yet I know if some giant searchlight were to sweep across the sky, other planes would be around us. Now and then, we can see the outline of one off our wingtip, and there is an occasional lurch caused by the slipstream of the Liberator ahead of us . . .

Eight hours have passed and now it is daylight. We are still over water but land, enemy-held land, is in sight. We are nearing the target.

"Enemy interceptors ahead," our radio crackles, and we can see some of our planes already exchanging fire with them. A flaming thing curves across the sky and falls sharply away. One less Jap fighter.

We reach our initial point and turn for the bomb run. "It's your ship," the pilot calls over the interphone and I know for 90 seconds I'll be in command, and our squadron will follow the course I set over the target.

Things are happening all around now. We expected about 25 enemy interceptors but there are 50 to 60 bearing down on us. I can hear our copilot and gunners calling out their positions.

"One high at 12 o'clock, two low at three."

"Watch those guys above us in the sun, Hass."

"Look out, here they come."

I can feel the vibration as our gunners fire round after round, and now we are over the target. Their ack-ack is opening up. It is very accurate, deadly. It has us bracketed. There goes one Lib, then another. Down they go, flaming a farewell to us. I split a beer with one of those guys last night.

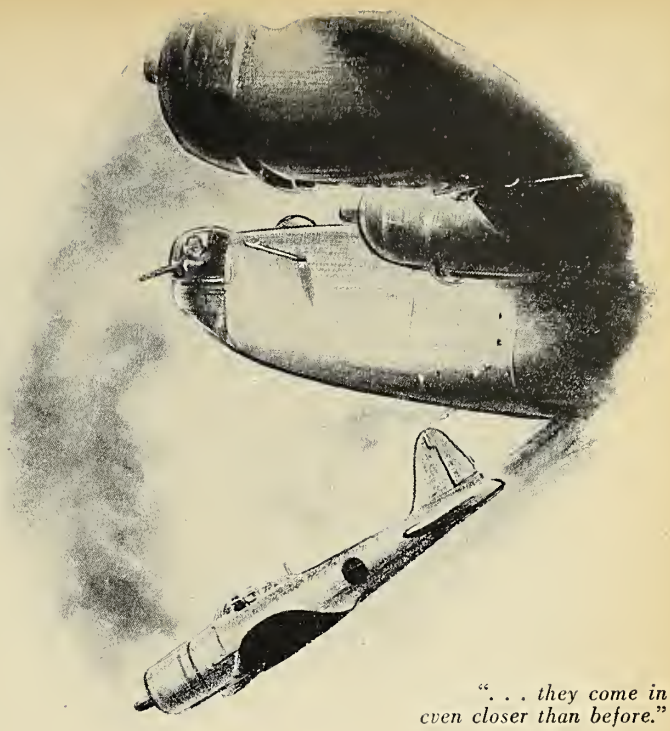
But I've got to watch this mechanical brain. It is solving a problem from the information I put into it. Altitude, airspeed, drift. Now the pointers are closing. Bombs away. I try to get in on the interphone but our copilot is screaming to our ball turret gunner.

"Black, Black, two level at 10 o'clock."

Black's vision is restricted but he swings his turret around and two Jap fighters close in together in trail to less than 100 yards. Black catches them in his sight and fires a long burst.

"I got one," he yells. "I saw the bastard explode."

"You did like hell," Romo at the right waist guns shouts back. "You got both of them. I saw the pilot of the other ship bail out over here."



". . . they come in even closer than before."

We have turned off the target now, and on the ground lights and explosions tumble on one another so rapidly I can't follow them. Weird pools of flame form in black clouds of smoke. Balikpapan's huge storage tanks of aviation gasoline are burning in a stew of fire and brimstone. I have seen fantastic sights in this war—a blue sky full of confetti that turned out to be paratroops, a big naval action at night, a dog fight between a P-38 and two Zeros—but I can roll all of them into one and still get no spectacle as eerie, as incredible as this sea of flame beneath us. Even now, the black columns of smoke are at our flight level, 18,000 feet.

The tempo of battle increases. They failed to stop us on our run, and now they are enraged and desperate. They come in even closer than before, flying recklessly in and out of our formation, always firing. One gets too reckless. He tries hard to pull up, but he is too late. He crashes into one of our bombers. Both planes explode and fall, twisting and burning. The pilot of that Lib was a buddy of mine; I feel slightly sick.

Now we are well away from the target and most of our attackers have turned back. Their losses have been heavy—but our group paid dearly, too. Our pilot calls the crew, one by one, asking each in turn if he's all right and if he knows of damage to our plane. Jackson in the nose turret says, "I'm OK." I tell him I'm all right, and so on back to the tail turret. No answer. The waist gunners are ordered back for a look, and soon they tell us, "Mac has a slug in his leg and his interphone is shot out. There's a hell of a big hole in the horizontal stabilizer, too." Seconds later, one of them adds, "Mac's OK. We can fix him up."

Our home field comes into sight just as the sun is dipping behind the horizon. We are very tired, very glad, very thankful. Burma seems to be, too, and she comes in for a perfect landing. She's very graceful for such a big girl. As we pull off the taxi strip and cut our engines, our crew chief walks slowly out of the twilight from the bunker's edge. He looks relieved. His name wasn't on our load list last night but his heart was aboard, every minute of the mission.

One by one, others of our squadron come home. ☆

AAF QUIZ

WHAT'S YOUR AIR FORCE I.Q.?

Here is your monthly brain-twister. Chalk up five points for each correct answer. A score of 90 or above is excellent; 75 to 85, good; 60 to 70, not too bad; below 60, tsk, tsk. Answers on Page 60.

1. Iwo Jima is
- A. *The name of a Japanese general*
- B. *One of the Volcano Islands*
- C. *A new Jap bomber*
- D. *One of the Philippine Islands*

2. The V-2 reaches a maximum altitude during flight of approximately
- A. *60 miles*
- B. *120 miles*
- C. *25 miles*
- D. *10 miles*

3. The ME-262 is a jet-propelled aircraft
- A. *True*
- B. *False*

4. Mukden is located
- A. *In south central China*
- B. *On the Japanese mainland*
- C. *In the Philippines*
- D. *In Manchuria*

5. A non-flying officer who participates in regular and frequent aerial flights ordered by competent authority receives an increase in base pay of
- A. *20 percent*
- B. *50 percent*
- C. *$60 per month*
- D. *$100 per month*

6. To what do the initials AFTAD refer?

7. World War I was legally terminated by joint resolution of Congress
- A. *Three days after the Armistice*
- B. *Approximately one year after the Armistice*
- C. *One month after the Armistice*
- D. *More than two and a half years after the Armistice*

8. The Bronze Star Medal ribbon is
- A. *Red with a blue stripe at each end*
- B. *Red with a vertical blue stripe in the center*
- C. *Blue with a vertical red stripe in the center*
- D. *Blue with a red stripe at each end*

9. Manila fell to the Japanese on
- A. *Jan. 2, 1942*
- B. *May 26, 1942*
- C. *Dec. 12, 1941*
- D. *Mar. 6, 1942*

10. Each engine of the C-82 is capable of developing how many horsepower during take-off?
- A. *1,000*
- B. *2,100*
- C. *1,650*
- D. *1,850*

11. With reference to the standard flight instrument panel, what is parallax error?

12. Wurzburg is
- A. *A German city about 20 miles due north of Berlin*
- B. *German radar apparatus*
- C. *A German non-com grade*
- D. *A German anti-personnel mine*

13. From December 7, 1941, to January 1, 1945, how many Medals of Honor were awarded to AAF personnel?
- A. *11*
- B. *24*
- C. *56*
- D. *98*

14. The helicopter was first test flown by the Army on
- A. *May 6, 1941*
- B. *Nov. 19, 1942*
- C. *Dec. 18, 1922*
- D. *Mar. 12, 1938*

15. Where is headquarters of the 16th Air Force located?

16. All turret guns on the B-29 are fired by remote control.
- A. *True*
- B. *False*

17. What have Aparri, Vigan and Legaspi in common?

18. If you are riding the Fireball, you are
- A. *In a four-engine German plane.*
- B. *Traveling in an ATC plane*
- C. *Piloting our new jet-propelled aircraft*
- D. *Flying in a B-17 equipped with fire bombs*

19. The commanding general of the 9th Air Force is
- A. *Lt. Gen. Lewis H. Brereton*
- B. *Maj. Gen. Hoyt S. Vandenberg*
- C. *Lt. Gen. Millard F. Harmon*
- D. *Maj. Gen. Curtis E. LeMay*

20. Identify this plane ↓

Rendezvous

(Continued from Page 3)

tion of Air Forces Women may be worn by all of its members. Membership is open to any wife, mother, widow, daughter or sister of an AAF man (flying or ground personnel), who is or has been on active duty, or any woman member of the armed forces attached to the AAF.—Ed.

"Rocketry"

Dear Editor:

As a longstanding and ardent proponent of rocketry, I must protest the wording in an article appearing in the November issue of AIR FORCE.

On Page 21 occurs the following statement: "In contrast to the rocket type 163, the 262 is a true jet propelled fighter . . ."

Why, I ask you, is a turbo-jet reaction engine a "true" reaction unit and a self sufficient rocket unit not?

In the light of my six years' experience with reaction units, I would be more inclined to call the liquid fuel rocket—oxygen and gasoline—a "true" jet propulsion unit for it is a self-sufficient entity, carrying not only its own fuel but also the oxygen necessary for combustion; whereas the turbo-jet unit relies on a gas turbine for extracting the oxygen (air) from the atmosphere.

Needless to add, both the rocket and the turbo-jet engine are "true" jet propulsion units.

A/C Robert M. Gordon, Chandler, Ariz.

You are correct. But while we're on the subject of correct wording, where did you find the term rocketry? It's not in our dictionary.—Ed.

Something to Give

Dear Editor:

Yesterday I read of the nation-wide appeal by the Army and Navy for a heavier contribution to the blood banks. It was prompted by the article in Stars and Stripes, published in France.

As long as I have been in the armed service, I have never been included in one drive for blood from the fellows still safely resting in these United States. Why not again, and again and again? Surely a request for blood from us fellows who are waiting in schools and training centers will be heeded with enthusiasm. It will relieve somewhat the incessant demand on our families and, perhaps, be to our advantage when we find ourselves in want of blood over there.

AIR FORCE asks for suggestions, and I believe none could be more successful, more encouraging to the guys over there, or more easily accomplished than a drive throughout the states for donations from the boys who have nothing more to give to date than six hours of school. I pass this suggestion on to you for a thought.

Pfc. Dan Summers, Chanute Field, Ill.

You are absolutely right. More of us stationed at home should contribute. To become a donor, contact The Red Cross.—Ed.

(Continued on Page 52)

technique

Development, Maintenance and Supply of Aircraft and Equipment

Propeller anti-icing test—See Page 46

Aerial Photos at Night

Using a camera-flash system which produces light equal to four million 40-watt bulbs, photo-recon planes now make low-altitude pictures of enemy installations at night without use of parachute flares or flash bombs.

In the new equipment developed by Dr. Harold Edgerton of the Massachusetts Institute of Technology, and the ATSC's photographic laboratory, the camera shutter is synchronized with the flash assembly so that each picture is snapped at the very instant the sun-like brilliance of the flashbulb reaches greatest intensity. Best pictures are taken at low altitudes, although addition of more condensers and reflectors foreshadows the perfection of the technique at altitudes above normal effectiveness of light flak. Additional refinements are also expected to increase the area of the present cone of illumination by about four times.

Major disadvantages of the M-46 flash-bomb method were that the number of pictures that could be taken on one mission was limited by bomb bay capacity and that consecutive, overlapping photos were almost impossible to obtain below 5,000 feet because the flash-bomb drifted far behind the plane before exposures could be made. With the Edgerton system, however, hundreds of consecutive shots may be taken simply by turning the film and "firing" the Xenon gas tube. The process is similar to the operation of newspaper flash-gun cameras, with the important exception that a single bulb lasts for several hundred flashes and does not have to be replaced after every picture.

Included in the unit (Type D-2) are the camera, flash assembly and control box.

The camera is a K-29 type modified from a K-17B. It has a 24-inch focal length with a 12-inch, f2.5 lens. The magazine uses high-speed roll film (Class N) 150 feet long and can take a whole roll of 200 individual exposures in less than seven minutes, or one photograph every few seconds.

To charge the lamp, the flash assembly's six condensers, two inverters, a transformer and a rectifier, boost the plane's 24-volt DC electrical system to 4,000 volts. The actual flash comes from a quartz helix flash tube when the stored electrical energy is discharged through the rare Xenon gas. Krypton, Argon and Neon gases may also be used, but Xenon gives the whitest light, most desirable for photography. The bulb fits in a large parabole-shaped reflector, 30 inches in diameter and 2 feet deep, which is spun in two sections of specially treated aluminum to produce a smooth, mirror-like surface.

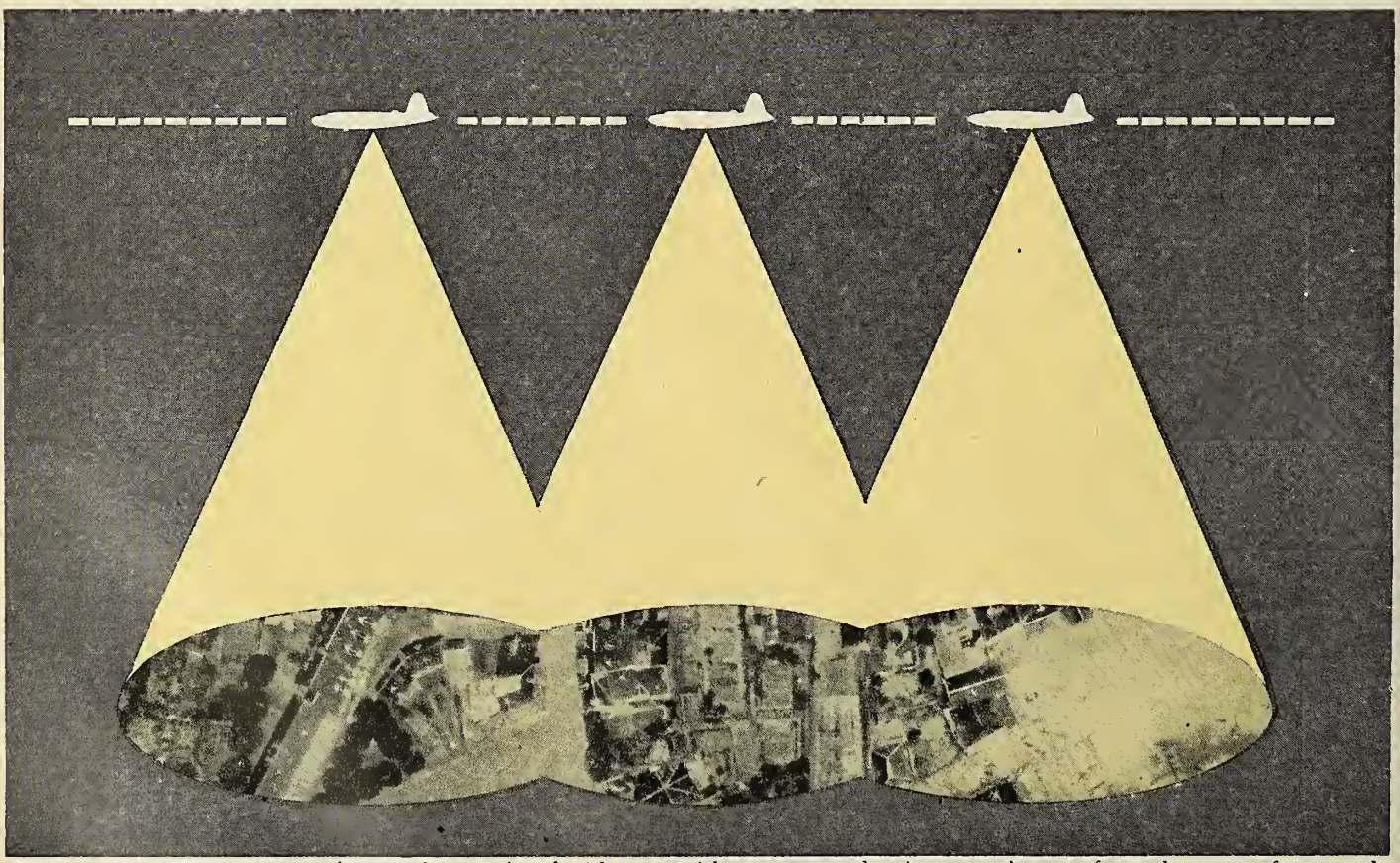
The remote control box can be located anywhere in the plane, permitting operation by pilot, bombardier or any other crew member.

The camera unit has an overall weight of 460 pounds and is suspended by a bomb shackle from a standard bomb rack, which makes it readily jettisonable in an emergency. Waterproofed for use in the humid tropics, it performs efficiently in arctic regions or in desert areas.

Flying Tankers

To get more fuel to B-29s in China, B-24s have been modified as fuel-carrying cargo craft with an overall capacity of 2,900 gallons—almost half again the amount loaded into the Army's large gasoline trailer trucks.

Redesignated as C-109s, two of these "flying tankers" can fly enough gasoline to China—in addition to the supply needed for their round trip over the Hump—to gas up a B-29 for a raid over Japan. Taking off from India once a day, 10 such cargo craft are able to



Flying at low altitude, reconnaissance plane equipped with new aerial camera can take pictures at the rate of one photo every few seconds.

furnish Superfortress bases with 1,200 gallons every hour.

To load and unload the C-109, standard gasoline transfer systems are employed, with nose tank and three deck tanks operating from one pump, and bomb bay tanks from another. A hose which fits into the side of the plane like a coupling joint on a fire plug permits gas to be pumped into any type of large container.

All-metal bomb bay tanks were especially designed, since regular types were non-metallic and excessively heavy. Deck tanks also were tailor-made, incorporating specific shapes to fit the turtle-back fuselage contour over the B-24 bomb bay. Metal bands with felt padding hold tanks in place and dampen vibration.

As a safety measure for the crew, an internal electrical system is automatically rendered inoperable during loading and transferring operations. "No smoking" rules are rigidly enforced, and static discharge lines ground accumulated electricity when the plane is on the airstrip. To eliminate gas fumes from half-empty tanks, inert gas is injected as fuel is pumped out, thus reducing the danger of explosions from sparks or strafing attacks by enemy planes.

Rescue Entries Marked

Crash crews working at airplane accident scenes are often handicapped in attempts to rescue trapped airmen because they do not know on what parts of the fuselage forcible entries may be created without encountering fuel and hydraulic lines, strong extruded members and heavy bulkheads. To designate areas on multi-engined metal aircraft (except fighters) where such emergency entrances may be effected, the office of the Assistant Chief of Air Staff, Materiel and Services, has directed the ATSC to publish technical orders to provide for marking safe cutting spaces, exclusive of regular doors and escape hatches. Each corner of the skin section so prescribed will be clearly labeled "Cut Here for Emergency Rescue," while doors and hatches will be marked on the outside of supporting structures so they may be cut out if they become jammed. By such quick access to casualties, many lives may be saved.

New Hydraulic Pumps

A new hydraulic pump, recently put into production principally for large planes in the B-29 class, now develops double the 1,500 pounds maximum pressure of present geared-type pumps. Designated as Type B-21, the pump

tech topics . . . about aircraft and equipment

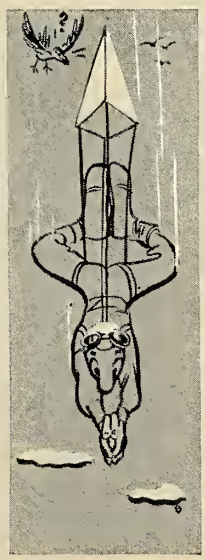
A special flight engineer's panel for B-29s will be used for training engineers in handling the galaxy of instruments that are required for operation of the big bomber. A detailed model of the fuel injection system equipped with clear plastic covers permits observation of the component parts and their functions, helps to familiarize maintenance men with the new system.

New flight instruments have been developed for the helicopter. Special gauges to record forward, backward and lateral motions of the craft and airspeed indicators to show zero and reverse speeds have been perfected by instrument engineers.

The XR-6 helicopter has redesigned engine cowlings that improve oil cooling systems. . . . The Army also is running tests on a new helicopter which is shaped like a jelly fish. Its two rotors rest in the same plane and intermesh with each other like gears. Flight is reportedly "very smooth." . . . Future helicopters may have all-metal rotor blades, now being tested. New helicopters will incorporate an automatic pitch reduction system. The mechanism operates in response to engine speeds, the pitch of the rotor blades being decreased when the engine drops below a predetermined speed.

Because high pressure oxygen cylinders must be handled with extreme care while loading them aboard a plane, a low-slung, three-wheeled platform with twin clamps to keep the cylinder in place has been designed. The carriages, known as "oxygen trolleys," are hooked together in train fashion so they can be hauled around an airdrome to planes needing refills.

To hold shoes on paratroopers against impact forces of chute openings, a wide strap has been adapted for type A-6 shoes. . . . Engineers at M.I.T. have developed a delicate shock recorder for measuring "jerk" pressures on parachute suspension lines. Some twenty-odd paratroopers in combat areas are trying out a new triangular parachute that will be lighter and more compact than present types.



Use of slow-flying planes over friendly territory may permit dropping of supplies without parachutes. Food stuffs packed in ordinary sugar sacks, one inside the other, have been satisfactorily dropped in free fall from an altitude of 1,000 feet at speeds up to 125 mph. . . . An automatic interlock switch that prevents operation unless intercom systems are plugged in, has been added as a safety device for personnel in centrifuge tests which determine reaction to centrifugal forces.

The Cockpit Coordinator, a development of ATC, expedites the reading of a pilot's check list. The device consists of a long strip on which are printed all necessary operations for take-off, flight, landing and emergency procedures. Mounted on two small rollers, the strip may be turned quickly to any section desired. The entire instrument is encased in a plastic box with a transparent window. . . . The Cruising Guide is another aid for pilots. Specially prepared charts fit into a pocketbook-size container which can be used like a slide rule. By manipulating the cards or charts, figures appear in small transparent windows that tell proper IAS, manifold pressure, fuel consumption and range for every type of plane.

An improved type of switch box regulates the exterior lighting system on some planes. Producing 81 different combinations of white, green, red and amber landing lights, the new box permits a highly efficient system of identification codes.

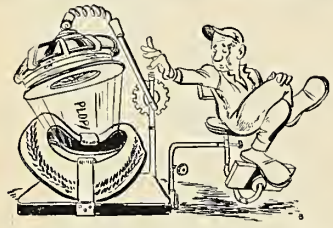
A tiny, red lamp on the pilot's instrument panel and a siren-like horn, both controlled by an automatic smoke detector, are parts of a new system to warn pilots and crews of interior aircraft fires. Smoke particles mixed with a steady airstream in a small box chemically actuate the fire-warning mechanism.

Modified so that it can use the 48-inch Eastman lens for 9 x 18 size negatives, the K-18 camera now incorporates the new louvre-type shutter. A stronger flange for the lens replaces present threaded brass flange and special baffles distribute warm air used for heating camera at high altitudes. . . . A special chemical is being used to save approximately $2,000,000 worth of fogged photographic paper once slated for salvage and disposal at various AAF depots the world over.

maintenance tips . . .

from the crew chief's stand

"The Benevolent and Protective Order of Mechanics Who Have Invented Tire Removing Appliances" is getting to be something of an institution. But if you're not ready for an institution—yet—your attention is called to the standard S-1 lever airplane tire removal kit, carried under Class 17-D, stock No. 7900-469670. Distribution has been made on the basis of



three to administrative squadrons, two to repair depot squadrons and one to tactical squadrons. The tools are made to handle tires from 26 inches to 56 inches. If kit instructions are followed, tire beads vulcanized to rims can be broken loose quickly and without damage. For added information, see TO 04-10-1, dated 1 September 1944.

Taking the measure of cylinder-head temperatures accurately is now simplified by a long-life bayonet thermocouple installed in a boss on cylinder heads of R-2800C, R-4360 and R-3350BB engines. An engine equipped with this new thermocouple may be installed in airplanes without rewiring or changing the indicating instrument.

Don't blame the gremlins when airplane wheels stick to a snow or ice-covered surface. After standing a while, the plane may be hard to move, with the possibility of real injury to rubber tires. When freezing is anticipated place a length of fabric, some straw or even leaves and twigs under the wheels, so they won't adhere to the ground.

Something to remember in cold weather, is that gasoline spilled on hands in subzero temperatures has the same effect as liquid air, and will freeze the flesh a few seconds after contact. Be especially careful in gassing up or fuel transfer operations, and for wiping off or cleaning jobs, use alcohol instead.

Tech orders are like parachutes; they have to be opened to be any good. And to make the process easier for men in the field, ATSC form 65-507 (formerly 3070) has been expanded, providing space to list requirements for basic handbooks in 01 and 02 series separately from short TOs in the same sub-series. The change also applies to TOs in 03-10B, sub-series C and 09, and Inspection and Maintenance Guides. Complete instructions are contained in a letter and explanation sheet, distributed in TO shipments. The reference for the new plan, which used to be TO 00-25-3, is now TO 00-5-2.

Right news for tight screws comes in the form of a loosening gadget that operates like a ratchet-action screwdriver with a bit that is rotated by a hammer or mallet blow. When screws, bolts and nuts seize because of high torque or corrosion, you simply whack the end of the handle with enough force to set the stubborn screw in motion. The tool has been standardized for addition to kits and sets of the 00-30 tech order series. Official name is Screw Loosener, Impact Driven, AAF Stock Catalog Spec. No. 7900-426700.

If you're an instrument specialist, you may think of an airplane as a cockpit panel with wings, engine and fuselage attached. This means that you undoubtedly will take a good look at the luminescent paint used in the new standardized instrument dial markings. The latest fluorescent lacquer (Spec. No. AN-L-13A) has approximately the same brightness as the old material (TT-R-58) under violet light and in the dark, but its drop in intensity when cockpit lights are turned off affords instantaneous blackout of all dials, whereas the other dropped gradually over a period of hours. For nonessential flight instruments, however, and for all night fighter instruments, paint AN-L-1A is used. This has no self-luminous property, showing only when under ultraviolet light.

In general, use of luminescent material has been reduced to cardinal increment markings, with non-luminous Munsell green paint used for all other graduations.

can produce a pressure output equivalent to 9½ horsepower. It consists of nine pistons mounted on a circular cam plate and held in place by small springs. Check valves for each piston absorb shock caused by air which sometimes forms in the fluid lines.

The pump weighs about 6½ pounds and is mounted on the engine accessories pad for use with any conventional aircraft engine.

De-Icing Propellers

For the past two and one-half years, protection of propellers against icing conditions has been a major consideration for military aircraft that must fly through severe icing weather.

To break off ice from propeller blades without decreasing efficiency and heightening vibration due to unbalance, Wright Field's Propeller Laboratory engineers are perfecting methods of "mushing" the inner layer so that the loosened mass may be thrown off by centrifugal force. So far, the ice-preventive systems under development include a fluid anti-freeze, a surface compound, an electrical thermal unit and a hot air system which circulates warm air through hollow props.

The fluid method employs Iso-Propyl alcohol, which passes through discharge tubes to the leading edges of the propeller blades and tends to reduce adhesion of ice to metal. A small tank, filled with enough of the chemical to last several hours, stores the anti-freeze until it is hydraulically pumped to a slinger ring around the propeller hub. This method is considered moderately effective for the protection of small diameter props (approximately 12 feet) but is limited to non-combat aircraft.

The surface compound is hand-brushed over the blades and acts as a freezing-point depressant by providing a flexible skin finish that resists adherence of ice particles and causes them to be readily hurled off the whirling propeller. The substance has a duration of approximately three and one-half hours under icing conditions, after which it loses its chemical potency. It is non-inflammable, and may be combined with the fluid described above for multiple protection on long range missions. However, it has the disadvantage of lowering propeller performance, and for this reason is not recommended for fighter planes.

The electrical thermal method, now being tried experimentally, uses a special rubber heating element, or a high resistance alloy which is cemented to the leading edge of each propeller blade.

Ice formations on propellers pose a problem for ATSC engineers, who must eliminate such conditions without impairing prop efficiency.

photo. The towering test stand shown in the picture has a 2,000-horsepower electric motor that can whirl blades up to an arc 40 feet in diameter. For this particular test, run in sub-freezing temperatures, each of the blades was painted with a different anti-icing compound, and the six-bladed club propeller was rotated at 1,000 rpm while water was sprayed against it, forming ice particles. Only one of the compounds used was successful, but the test results led to the development of some of the de-icing methods now in use.

Control Aids for B-24

A Liberator was nosing into the air after take-off when failure occurred in one of the outboard engines. The plane lost directional control and, before the pilot was able to compensate with rudder trim tab for three-engine operation, the B-24 crashed.

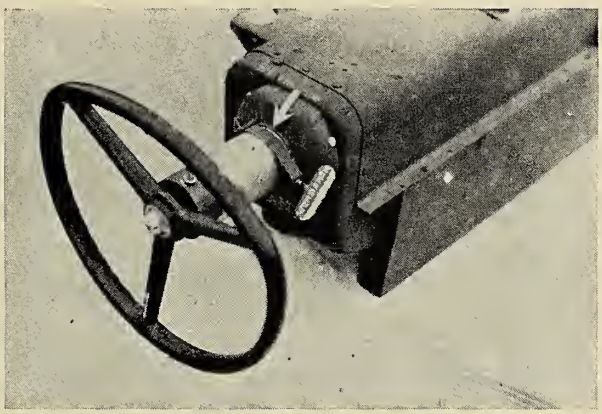
Investigation revealed that when outboard engine cut-out occurs at low altitudes, present-type rudder tab hand knobs cannot be rotated quickly enough to prevent loss of directional balance—especially if the pilot's hand is perspiring or if the system is unusually stiff.

Under the guidance of Maj. Joseph McKeown, ATC's test unit in Florida went to work on the problem and devised a crank control which provides instantaneous tab action by means of crank leverage and free-spinning knob. The device has been recommended for installation on all B-24s and C-87s.

Other safety appliances for Liberator controls are two simple but vital devices which effectively lock rudder, elevators and ailerons during conditions when control surfaces are so badly shot up that the plane can only be flown by the physical effort of holding controls in an abnormal position, preventing the pilot from leaving the controls in order to bail out.

The lock for elevators and ailerons consists of a hose clamp (FB No. 60) 2¾ inches in diameter, riveted to the roller cover. When pilot has plane under control, he can tighten clamp, which has withstood the pull of two men in tests.

To lock the rudder, a positive foot-

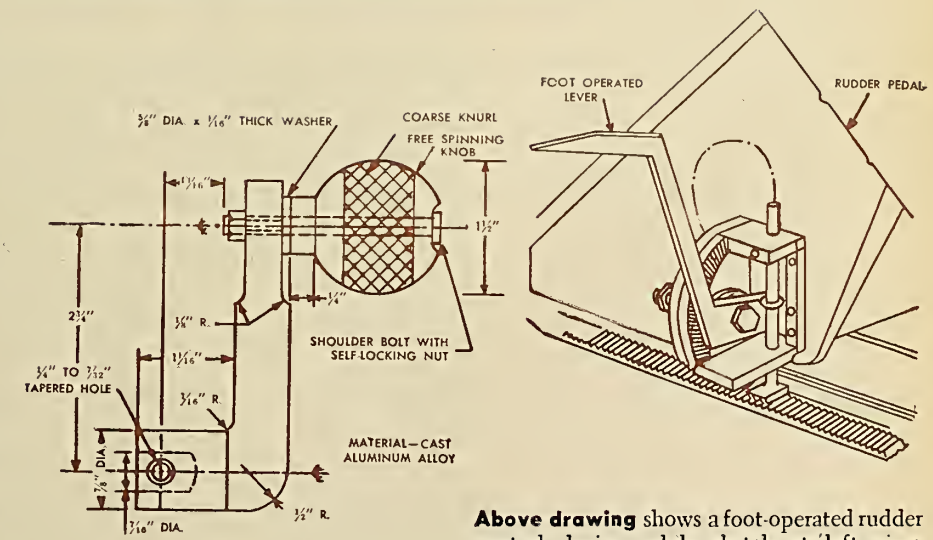


At left, arrow points to the emergency clamp on Liberator control wheel which enables pilot to lock the elevators and ailerons when control surfaces are damaged.

Power is taken from the airplane's main electrical system or from a small hub-mounted generator, and de-icing is accomplished when current flows continuously to provide constant heat in the rubber or metal covering. By another method, current may flow intermittently into the thermal pad to loosen the ice layer as it builds up. However, the continuous flow procedure is being tested at Ladd Field, Fairbanks, Alaska, on a specially equipped C-54, and with minor modifications it is anticipated that this system can be incorporated in all existing types of service aircraft.

The hot air solution to the de-icing problem is still in the development stage, and requires a revised construction to strengthen parts of the propeller shank around the oval-shaped holes through which the heated air passes. Hot air enters these holes from a combustion heater mounted on the engine, and leaves through other openings near the tip. In principle, it is similar to heated wing installations, but is adaptable only to hollow blade propellers.

Early tests with anti-icing compounds were run on the whirl test rig at Wright Field as shown on the Technique cover



Above drawing shows a foot-operated rudder control device, while sketch at left gives details of knob for quick trim tab control.

operated control has been perfected, which locks rudder pedal while in flight. It was conceived by Lt. Col. Charles Mixter in cooperation with Lt. Col. Maurice Walsh. The design of this control and the elevator-aileron lock was accomplished by Capt. Reuben Yarri and men of the 29th Service Group of the 13th Air Force.

What's New in Radio

When radio equipment went to war in Army aircraft, it soon became apparent that the change from civilian status had been too sudden and that many adjustments would have to be made before it could achieve its full military value.

Today, most of the early difficulties have been smoothed out, and new technical discoveries are constantly being added to modification kits for rush shipment to combat theaters. Among new developments in AAF radio equipment are an air-to-air communications system that works practically automatically, a new liaison transmitter for air-to-ground operation, an interphone system that does not fail at high altitudes, improved antennae, effective techniques for noise elimination, and a radio marker buoy for indicating the position of survivors at sea.

In the older sets, the radio signals would fade as a plane gained altitude. Then, on descent, audio output would increase so rapidly that eardrums would be jolted unless the radio operator frequently cut down on the volume. With the latest command set for air-to-air communication between planes of a formation, however, frequencies are preset on the ground and the radio operator simply selects the channel he desires to use. The receiver then automatically picks out the frequency and tunes it in without any dial-twisting.

For plane-to-ground communication, a new liaison transmitter with an effective range of 600 to 1,000 miles, depending upon proper frequency selection, has been standardized and is now ready for installation in Army planes.

It is 100 pounds lighter than the existing BC-375 and is consolidated into one unit, plus the dynamotor, with preset channels in the high frequency band. Like the air-to-air set, selection of each channel is accomplished automatically, requiring approximately 25 seconds. Manual frequency selection may also be made without interfering with the pre-set channels. The equipment will operate reliably at levels up to 40,000 feet, and provision has been made for continuous wave (cw), modulated continuous wave (mcw) or voice emission. Operation is so simple that the pilot or copilot can operate the set by a remote control unit installed in the cockpit.

Radio mechs change loop antenna to smaller size in streamlined housing. Antenna shown in foreground had created excessive drag.

To eliminate the bugs in interphone systems, the ATSC's radio laboratories, in cooperation with the Psycho-Acoustic Laboratory of Harvard University and the Proving Ground Command at Eglin Field, Fla., embarked on an extensive program of investigation which culminated in the development of a new interphone amplifier. To reduce high altitude failures, this new amplifier has increased sensitivity which compensates for low microphone output in upper air. It also has a three-step volume control which modulates the increased power output capacity of the amplifier in order to overcome the reduced sensitivity of headsets in high flying.

Research and tests with untried materials have also led to the development of a VHF vertical antenna formed of streamlined compregwood with a metal plating. This antenna is able to withstand icing and acceleration loads, reduces drag, minimizes effect of excessive precipitation static, and picks up and radiates low frequency waves more effectively. In cases where trailing wire antennae are used, a motor-driven reel now winds things up neatly for the radio operator, without his having to crank the reel manually. The function can be performed remotely, permitting installation of the equipment in less crowded portions of the plane.

Work on noise elimination methods has resulted in the perfection of several systems which greatly curtail the trouble-making potential of undesirable sounds. By using a "probe antenna," technical engineers locate sources of noise in loose metal or electrical connections, faulty ignition and elsewhere, and "dampen" out the interference. Precipitation static, which is caused by the passage of rain, snow, ice or dust over the metal skin of the plane and which often makes proper radio reception impossible, is now considerably reduced by a static discharging device in the form of a Prestone-filled tube with a trailing wick. Riveted to the outside covering of the fuselage, the device prevents electrical charges from building up on the aircraft by emitting a constant flow of the accumulated charges. This device is now being superseded by a dry-type discharger, which does away with the use of a fluid.

Portable transmitters and receivers have been put to many uses, but one of their most recent jobs is as marker buoys for indicating the position of survivors at sea. Parachuted into the water from a plane, transmission of a coded, repetitive distress signal begins as soon as the buoy strikes the surface. The beam is sent out continuously for twelve hours, and ships and planes can be guided to the buoy by means of their radio compasses. After its operating period ends, a soluble plug dissolves, the buoy fills with water and sinks.

The hub of these and other radio developments for the AAF are the radio laboratories at Wright Field. There, products of research laboratories, URs and special requests from theater Air Forces are brought together for study, test, modification and design.

Air Position Indicator

A navigational aid which provides instantaneous indication of latitude and longitude of air position, air miles flown and true heading, all on the face of a single dial, now frees navigators from previous time-consuming dead reckoning operations.

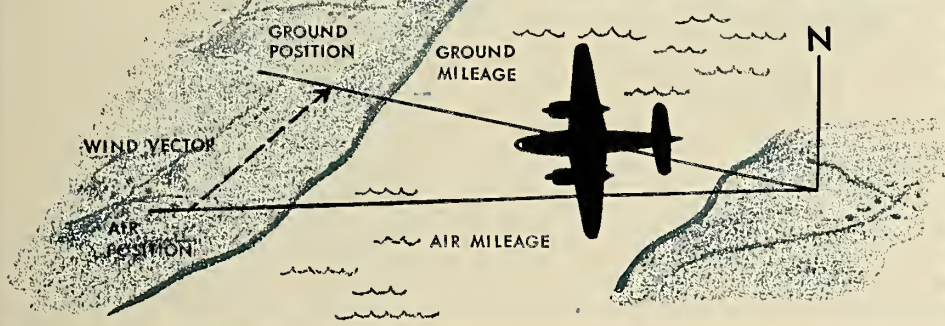
The API system includes an air mileage pump, control unit, amplifier and computer, as well as a remote reading compass, either gyro-fluxgate or magnesyn. Driven by a small motor, the pump generates differential pressure to the computer by means of rotor having a speed proportional to the true airspeed of the plane. Two diaphragms in the control unit regulate the speed of the air mileage pump, while special vents in the side of the fuselage permit cooling to avoid temperature errors. Meanwhile, the amplifier electrically

converts compass signals for the positioning computer, which automatically calculates compass data and true airspeed readings into the desired latitude and longitude for indicating air position.

The API permits the navigator to leave his station for emergency duties elsewhere in the plane, with every confidence that when he returns to his charts he will have reliable data available. The instrument remains accurate even during violent evasive action.

The installation is limited to B-29s and other large aircraft, but experiments are continuing for fighter adaptation.

Instrument computes factors in diagram below and indicates air position on face of dial.

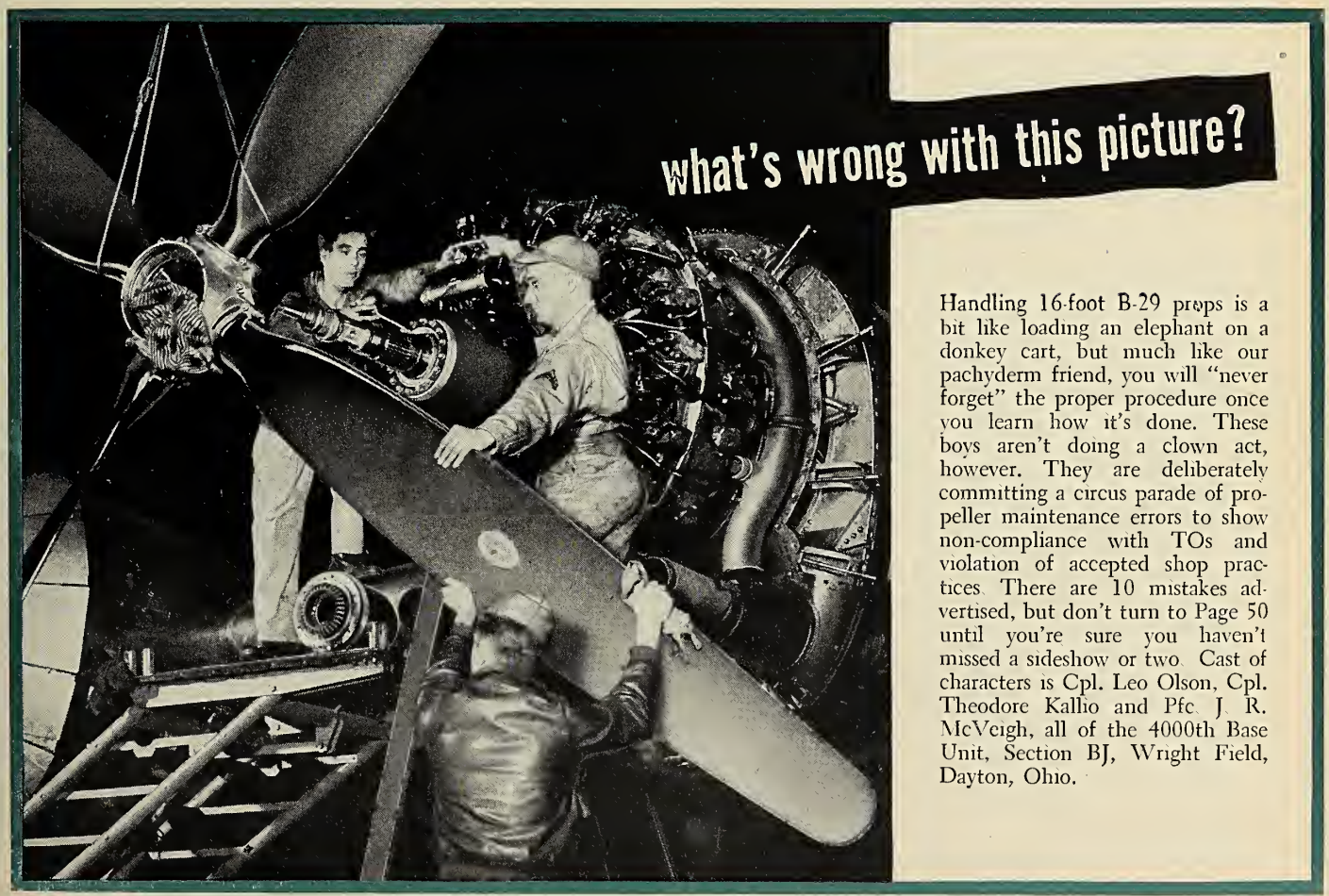


Battle Laboratory

Combat units of the 8th Air Force, seeking a solution on the ground to problems that develop in the sky, bring their troubles to the 8th's Maintenance and Technical Services Section for expert assistance in de-bugging difficulties and revising operational techniques and procedures.

Recently, an epidemic of top turret fires resulted in loss of valuable bombers and crewmen and focused attention on fact that chief source of trouble was the gunner's oxygen line running through the bearing on which the turret revolved. Analyzing the situation, the section modified available parts to devise a shut-off valve with which the pilot or copilot could cut the oxygen supply to the top turret in event of a blaze. The design, distributed to units for immediate installation, is directly credited with saving at least 11 B-17s in which such fires occurred.

In another instance, the generator drive shafts on heavy bombers were proving defective, one bomber group alone reporting more than 100 failures in a single month. Investigation showed that not only was a mechanical



Handling 16-foot B-29 props is a bit like loading an elephant on a donkey cart, but much like our pachyderm friend, you will "never forget" the proper procedure once you learn how it's done. These boys aren't doing a clown act, however. They are deliberately committing a circus parade of propeller maintenance errors to show non-compliance with TOs and violation of accepted shop practices. There are 10 mistakes advertised, but don't turn to Page 50 until you're sure you haven't missed a sideshow or two. Cast of characters is Cpl. Leo Olson, Cpl. Theodore Kallio and Pfc. J. R. McVeigh, all of the 4000th Base Unit, Section BJ, Wright Field, Dayton, Ohio.

P-51 with two 108-gallon droppable fuel tanks made of paper and externally hung, has all Germany within range.

adjustment necessary, but that related equipment had been affecting generators adversely. Within six weeks, tests were completed and recommendations made. During the following month, only one failure was reported.

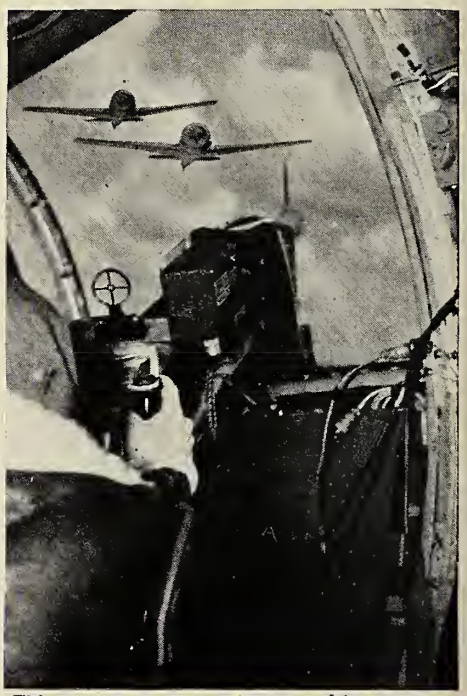
Among important projects undertaken recently has been the job of equipping fighters with droppable tanks to enable them to escort bombers on long-range missions. Experiments were conducted with more than a score of different external fuel tank installations before high altitude pressurization problems and other kinks could be eliminated. Finally, a container, made of stressed paper covered with doped fabric, was approved for local manufacture, with the result that no enemy target in Europe is now safe from fighter-escorted heavy bombers.

Other contributions the section has made toward tactical efficiency include adaptation of a British bombardment compensating sight for fighter use, refinement of target marking and control methods for bombing in cooperation with ground troops, and extensive advances in sky signalling with chemical smokes. Officers and GIs are also encouraged to submit ideas and suggestions, and currently approved devices include a crank adapter for emergency operation of B-17 landing gear, a modification for interphone amplifiers, an improved carbon dioxide release cable for life rafts and a centralized oxygen warning system which tells the pilot whether all crew positions are receiving oxygen.

The section is in charge of Cols. Ben S. Kelsey and Cass S. Hough.

Camera Gun for Crew Training

Among the newer wrinkles in B-17 gunnery training is a camera mounted on a machine gun, which enables crewmen to shoot pictures instead of bullets at simulated attacking fighters. At Avon Park (Fla.) Army Air Field, where one of the units is installed, every trainee shoots 200 feet of film at moving targets during four "gunnery missions." After the film is processed, gunners assemble in a projecting room



This camera mounted on machine gun enables gunnery trainees to shoot pictures instead of bullets. The targets shown are realistic models of enemy fighter planes.

WHAT'S WRONG with the picture on page 49

1. You don't put on your shoes before your socks do you? B-29 props and ring cowls have the same relationship. If you install the prop first, you can't get the cowl in place.

2. The man on the left blissfully oiling the rear cone will be looking for the chaplain when the thin film of lubricant disappears, the cone becomes loosened and the propeller starts vibrating. Here's the recommended procedure: Coat the spider splines lightly instead of the shaft splines to prevent oil from touching the rear cone when the prop is installed because oil will gall the cone and cone seat.

3. That do-or-die grip the two men on the stand are maintaining on the pressurized lead to the magneto distributor, will end in a double handful of trouble. Fittings will be loosened in this way, causing leaks.

4. The distributor valve will be violently distributed if it's left installed when the prop slides over the shaft. TO 03-20CC-1 says remove it to prevent damage.

5. Thread protector on end of shaft is missing in action. When prop slides over the shaft, those delicate threads will be scraped and marred, and the entire shaft will have to be replaced.

6. That's $400 worth of footstool the man with the oil can is standing on. One slight push and he'll sign a statement of charges for a new propeller dome.

7. Obviously, Maggie's drawers don't belong in the prop's outboard barrel half. It seems too big to be overlooked, doesn't it? However, inspections of failing propellers have yielded small pieces of cloth inside the dome that evidently were unnoticed during installation.

8. Uplift movements are OK in their place, but hoisting with a cable will make dents and nicks and set up stress concentration, causing prop failure. Canvas sling, stock No. 8200-855558, is the correct item to use.

9. If our friend in the foreground has his eyes open, he'll see that four-inch strips of yellow aren't painted on the tips of the propeller blades, as directed in TOs 07-1-1 and 03-20CC-1. It's a safety feature.

10. Blades look mighty bare without reference data. TO 03-20CC-1 says the drawing number, serial number and etched date *must* appear on each blade.

where veteran combat instructors point out the good and bad points of the aiming and firing.

Automatic Cargo Chute Release

Paratroopers or other personnel being supplied by air no longer need to struggle with manual release mechanisms to free cargo chutes from containers—or, for that matter, leg it over the landscape in hot pursuit of supply chutes that high winds drag along the ground. A new automatic ground release developed by the ATSC Personal Equipment Laboratory and soon to be standardized, snaps open to free the container as soon as it hits the ground, thus saving valuable time in emergency situations.

The device works on the same principle as a gravity spring scale, serving as a connecting link between chute and container, and using a hydraulic cylinder and piston to absorb the slack, or "no load" period which occurs for an instant after the chute whips open. While descending, the weight of cargo holds hooks in place but on striking the ground, the hooks spring open, releasing the chute.

Gun Turret Test Chamber

To determine mechanical defects in the feeding, firing and ejection systems of four-gun Sperry lower ball turrets, the unit is mounted on the platform of a 30-ton welding jig in Wright Field's 30-foot square firing chamber. For endurance firing tests, 5,000 rounds per gun are shot at short range into the walls of the chamber, which are constructed of 12-inch thick oak planking backed up by solidly packed gravel four feet deep. Empty shell cases which pop out and fall to the floor sometimes are ankle-deep after a full firing run. The small chamber eliminates the need for a large gun range and an electric welding jig turns it to right or left to simulate angles and attitudes of flight. Two large fans circulate 10,000 cubic feet of fresh air per minute, keeping room free of carbon monoxide fumes.

Rubber Caps for Guns

Small, synthetic rubber caps that fit over the muzzle end of .50 caliber machine guns, eliminate the necessity for taping guns to keep moisture out of barrels. Designed to afford protection from inclement weather in the air as well as on the ground, caps are not removed before missions. The first gun burst pierces the cap without affecting the gunner's aim. ☆

on the line

with mechs around the world

Men upstairs breathe oxygen out of tanks. Men on the ground have to put it back in. It sounds very simple—except when you're in the jungles of New Guinea and demand exceeds supply.

The only alternative is portable generators, and although these units were not designed to support large-scale, high-altitude operations, they have been made to do so by T/Sgt. Walter Cox and his crew of the 5th Air Force Service Command. Output of one plant alone was boosted from 10 to 70 cylinders a day, and a record month's production of three such jungle installations was 4,013 cylinders, or 802,000 cubic feet of oxygen.

To achieve these results, several modifications had to be made. There are two compressors in each portable unit, one for air and another for oxygen. During the process of compressing air, cooling it down to liquid form, and obtaining oxygen by fractional distillation, these compressors are often used on air. This induces a high back pressure which forces small amounts of oil into the oxygen compressor. When switched back to oxygen compression, the oil-oxygen mixture, plus the heat created, will blow up the plant.

Sergeant Cox and his men eliminated this danger by combining two units—using both compressors of one machine for air and a single compressor of the second for oxygen, with the remaining compressor left as a standby. The problem of engine overheating was solved by building a new, external-pressure cooling system, using de-mineralized stream water, obtained by precipitation of potassium hydroxide, as a substitute for the distilled water normally employed for compressor lubrication. Stops for refueling were cut by improvising larger tanks from spare bomb bay tanks. "But don't use leaded gasoline," cautions Sergeant Cox.

Straight from France comes the tale of three long-lived ladies of the air—Mustang fighters of a 19th Tactical Air Command base—who have amassed the total of 1,175 combat hours between them.

"Margie Maru" is 125 missions old and is kept in trim by S/Sgt. Juventino Lopez, Laredo, Texas, and Sgt. Joseph Eichenlaub, St. Genevieve, Mo. Cpl. John J. Pallishuskey, Minersville, Pa., is her armorer.

The "Atlanta Peach" has performed 105 consecutive missions without once turning back from her objective—emphatic tribute to the skilled maintenance of S/Sgt. J. F. Randall, Vicki, Okla., and Cpl. Alvin C. Conti, Arnold, Pa. Cpl. Willis Windhorn services her guns.

One hundred and one missions were chalked up by "Suzy Belle" before she needed an engine change, so well have S/Sgt. James R. Long, Lockhart, Texas, and S/Sgt. Benjamin R. Luttrell, Roanoke, Texas, performed their duties. Suzy's armament is the specialty of Cpl. Robert E. Starkweather, Lockport, N. Y.

If life is calm and serene for radio repairmen of the CBI Air Service Command, their relative ease may be traced in large part to a compact, portable test set which T/Sgt. Harry H. Hughes, Long Beach, Calif., built so that aircraft radios might be tested without their removal from the plane. With two men, one inside the cockpit and the other on the ground, the radio receives an on-the-spot check without having to be moved.

Even the crew chief's stand comes under the eye of improvement-minded maintenance men, and Lt. Bernard Woods, assistant engineering officer at Walla Walla Army Air Field, Wash., has redesigned this foursquare "old reliable" to make it more efficient for varying conditions.

By reshaping the forward side to a half-hexagon form, the "A" frame used to change engines and props can be wheeled into position without moving the stand, saving time and affording better footing.

The stand has two platforms to permit simultaneous work at different levels, while a canvas hood is installed for bad weather duty. Three 8-inch casters with a towbar provide ready mobility.

Not so simple were the problems confronting 15th Air Force mechs in Italy when the difficulty of relieving electrical current drain from aircraft batteries already installed in planes, proved a serious challenge. But with the mobile drainage unit which M/Sgt. Raymond W. Ainsley, Casper, Wyo., devised in his free time out of unused scrap, the thorny task was considerably simplified. Mounted on a cart, this apparatus can be moved right up to battery installations where the necessary connections can be made.

Three Aids to Victory: Repair of battle-damaged bombers has been speeded at an air depot of the 8th Air Force Service Command in England by the invention of three tools by a former Philadelphia designer, M/Sgt. Joseph Pucci.

"The Mouse," a short-cut name for a short tool, is a pneumatic expanding bucking bar used on repair of wing spars, considered one of the toughest problems in aircraft maintenance.

Similarly, his hydraulic taper pin remover chopped labor time from several hours to a mere 20 minutes and his rivet remover allows 50 to 60 rivets to be extracted in the time formerly needed to remove only one.

The Intercom

As a medium for the exchange of ideas, AIR FORCE presents these answers to its Question of the Month. Replies are those of personnel stationed at Atlantic City, N. J.

QUESTION: Among your WAC associates, who has done the most for the war effort?

Cpl. Phyllis Jorgenson: "The platoon sergeant who drilled us at our basic training camp, Des Moines, Iowa, was one of the most unusual Wacs I have ever known. I know it is very unusual for enlisted personnel to appreciate the work done by a drill sergeant but we all felt that our introduction to the Army was made easier by our sergeant. She got the work done and, if you can imagine it in the Army, we actually enjoyed learning to drill. Teaching a lot of awkward girls the rudiments of right oblique and making us like it, was a difficult job."

Pfc. Marion Carlson: "The Wacs who are doing the best work are those who are trained in jobs where they can pass along their knowledge to men. I mean Link trainer operators, mechanics, statisticians and signal tower operators, to name just a few. They are discharging the function for which the WAC was originally formed—to release men for other duties or to help men make better use of their talents. I think the work they are doing is really appreciated—the men understand that we are all pitching in for the same purpose."

Pvt. Thelma Simonsen: "The Commanding Officer of our company at Oglethorpe, Ga., where we took our basic training, was doing very effective work and deserves my admiration. She had a very difficult job in orienting all of the girls to Army life. It is much more difficult for women to make the adjustment than men—we aren't as used to the idea of discipline. In six weeks, our CO really made soldiers out of us. I certainly wouldn't want to switch jobs with her. I think she has the most difficult job in the WAC, and is doing her part for the war."

Pfc. Ruth Bush: "We must not overlook those thousands of loyal and patriotic Wacs who are working in the offices and doing a job that has to be done. There is nothing glamorous about sitting in front of a typewriter all day or keeping records of clothing, but somebody has to do it. Most of those jobs are dull and monotonous, but if you put all such jobs together, the war probably couldn't get along without them. I think the unsung, unpublicized Wac who keeps at the seemingly unimportant job is doing the most for the war effort."

Pfc. Juanita Heinkel: "There were twelve of us Wacs who received Military Police training at Santa Monica. We were a little nervous at first, but this disappeared as we were taught Judo and trained to use .45s, carbines, and riot guns. We even carried clubs. The training we received was the same as that given to the men—and we were ready to do the same kind of job. Principally, we stood guard duty and checked uniforms and passes. We never had any trouble for the men learned to respect us and realize that we were doing a job."

Pvt. Marion Jenks: "I believe that the Wacs who are overseas are doing the best job. They are living under rough conditions and many of them are making real sacrifices. Of course, that is nothing when compared to what the men are going through but the Wacs who are serving overseas are sharing many of the same hardships. It's much easier for a man to acclimate himself to that kind of living but I think the Wacs have learned to take it too. All the Wacs I know who served overseas want to go back again as quickly as possible."

Rendezvous

(Continued from Page 42)

More Records

Dear Editor:

. . . The squadron I flew with in England flew 68 consecutive missions without losing a plane. This must be some sort of record when you consider the fact that this streak was started a few months before the invasion and included many long-range missions to the heart of Germany, many of them to Berlin. It was 36 when I left for home and reached this record mark sometime after the invasion. By the way, we flew B-24s.

Lt. William H. Hayden, Lincoln, Neb.

The Hot Side

Dear Editor:

Wait a minute, I object! I am referring to my November issue of AIR FORCE . . . Herbert Ringold had a very fine article on the delivering of planes to Russia, but where does he get this business "Some few planes were going to the Soviet Union—around Africa and up the Persian Gulf by boat and then overland across Iran—13,000 tortuous miles?" True, it was a tortuous trip, but this statement about "some few planes" is very misleading. The ferry route from Great Falls to Fairbanks is the cold side of the story. Here is the hot side: Abadan, Iran and thence to Russia.

Well, here is what it is like in Iran. First of all it is reputed to be the hottest spot on earth, and I believe it! The average temperature ran from 120 degrees to 140 and up every day. The official records show that one day we had a sun temperature of 180 degrees F. There was no moisture at all. As for the dust, it was awful. It is impossible to describe the dust storms that were encountered, but anyone who has been in one will never forget what it was like. The storms came up quicker than you could snap your fingers, and the only thing you could do if you were flying was pray your luck was good and that God was in Iran at that particular moment. We had no radio aside from the local tower, whose range was 25 miles, minus!

As for working conditions, from April until late in October the whole base would get up at 3 a. m., and be at work by 3:30 a.m. You couldn't touch an airplane at 10 o'clock in the morning unless you had a pair of gloves on. It was like putting your hand in a hot skillet if you did. All of the airplanes with inline engines had to be towed to the end of the runway before they were started, as even the short taxi distance would heat them up too much.

It was tough, damn tough, and I for one think that we deserve some credit for the work we did while we were over there.

1st Lt. John K. Troster,
San Bernardino, Calif.

According to ATC, more than half of all planes delivered to the USSR went via Alaska. But we agree that the boys in the Persian Gulf Area deserve plenty of credit. So do the sailors on the Murmansk run, for that matter, and anyone else who helped get U. S. planes into Soviet hands. —Ed.

(Continued on Page 60)

Aviation engineers fight heroically to stop B-29's flames from spreading to other planes. Bulldozer is ramming dirt over the fire.

aps Strike Saipan

hese photographs show what happened on November 27, hen 16 ZEKES skimmed over Isley Field, Saipan, with eir sights fixed on B-29s they found parked there. Three ys before, the Superforts had dropped their first bombs n Tokyo and the Japs were desperately trying to head-off ture attacks by hitting Saipan night after night. In return, pounded the Jap base on Iwo, almost neutralizing it.

Foamite is sprayed on charred remains of Superfortress' big engines.

Not all Jap attacks are made by fighters. The photograph below was taken after a surprise high-altitude night raid by BETTY bombers that hit this Superfort dead-center. The Japs' bombs also fired a gasoline truck that may be seen blazing in the background.

Wrecked ZEKE being inspected is one of 13 destroyed during the Jap attack, six by Saipan-based fighters, seven by antiaircraft units.

THE CARE AND BRIEFING OF FIGHTER PILOTS

(Continued from Page 11)

seale eontour maps which are invaluable in determining the best way to hit the target. For example, a mission which tries to elimb a mountain right after the target is just inviting attention from flak.

Sometimes maps eovering the route will prove inaeeurate and inadequate, as when our group was assigned to lead a strafing mission against an enemy airdrome. In this ease the sought-for information was obtained from Photo Freddie pilots who had flown over the target.

Oeeasionally a dive-bombing mission may be flown at low-level right up to the last minute in order to effeet surprise. An instanee of this was the P-38 dive-bombing raid against the Romana Americana Refinery at Ploesti, when Col. William F. Litton, CO of the 82nd, led his P-38s on the deek for over 600 miles in an attempt to reaeh the target before the eustomary effeetive smoke sereen eould be thrown over it.

Both in helping plan a mission and in briefing it, an S-2 offieer must be eternally alert. He must use his imagination. On a dive-bombing mission against Valenee Airdrome last summer, one of the landmarks was a fork of the Duranee River. Although he had notieed it on the map, the briefing offieer (in this ease the writer) negleeted to point out the similarity of another fork of the river about 20 miles to the south. The mission got a bit off eourse, thought the wrong fork was the right one, and proeeeded merrily along without ever finding the assigned target.

Briefing in our group takes plaee an hour and a half before take off. It is prepared and delivered by the S-2 offieer in a manner designed to present all faets on the mission in simple fashion and logieal sequenee. The data eovered in sueh a briefing has often been deseribed. Generally it will cover the results of yesterday's mission, the Air Foree program for the day, the group's partieular assignment with chronology and route, deseription of target and its importanee, flak, enemy fighters, P/W eonduet, air-sea reseue, radio homings, ete.

The weather offieer then delivers his foreeast, watehes are coordinated by a time eheek, and the briefing is elosed by the formation leader who eovers at length exaetly how the mission will be flown in the air. The briefing ean take twenty minutes or four times as long, depending on how diffieult and eomplieated the mission may be.

Eaeh pilot is given information eoneerning take-off, rendezvous and target times, the mileage and magnetie eourse for eaeh leg of the eourse and other pertinent data. The S-2 offieer eheeks with the pilots, traeing out the route on the map with his pointer. The S-2 seetion also provides maps with eomplete eourses and times for squadron and seetion leaders.

Information used in eaeh briefing eomes largely from the Operations Order and its Intelligenee Annex reeeived through channels from the Air Foree during the night. Additional sourees of briefing information are the daily and weekly Air Foree and Wing summaries and memoranda which the S-2 must read faithfully to keep up to date. And for every target the Group S-2 Target Seetion has a speeial folder on file with aeeumulated photos, target eharts, and other information.

Our group maintains its own full-seale fighter and flak situation maps, ehanged daily as new photo reports eome down from Air Foree. Oeeasionally information is reeeived from other sourees. Last autumn a P-38 mission flying over heavy eloud eover in Yugoslavia popped into the open for a minute and was blasted by an aeeurate eoneentration of bursts from a single German battery which shot down one P-38 and put some 60-odd holes in another. Nobody was able to plaee the exaet loeation of this battery. However, several weeks later, the pilot who had been shot down made a sueeessful eseape, returned to the group, and informed the intelligenee offieers that aeeording to the Yugoslavs this partieular battery had by far the highest seore of Allied aireraft destroyed in the entire eountry. The eseaped pilot pinpointed its loeation on the flak map and the area was studiously avoided thereafter.

Interrogation after a mission takes plaee as soon as the dust has eleared and the pilots have reaehed the S-2 hut to eolleet their eoffee and doughnuts from the Red Cross girl. Eaeh squadron is interrogated separately by its two intelligenee offieers in front of a large map adjaeent to the S-2 offiee.

Interrogation is a fairly simple proeedure and eonsists mainly of letting the pilots tell their story in their own way. After a eouple of dozen missions the older pilots generally know what sort of information their S-2 is after and give it without too mueh prompting. Squadron and flight leaders are the most reliable informants. New and inexperieneed pilots, flying as wingmen, generally see little more than the plane ahead of them during the entire mission.

Prime responsibility of the S-2 is to see that no pilot eseapes from the interrogation without having first given up all information of any value. It is not desirable—as onee happened—to have a eonseienee-strieken pilot eall up some two hours after the briefing and announee that he has forgotten to report an important enemy submarine sighting in the Adriatie.

When there has been a hot strafing mission or aerial battle with the Luftwaffe, it is the diffieult and sometimes unpopular duty of the S-2 to insure that the vietory elaims of our pilots are as nearly aeeurate as it is possible to be. It is obvious that in some instanees two pilots may both in good faith be elaiming the same plane, and this duplieation must be eliminated.

Last summer the 82nd eaught a formation of 16 ME-410s elimbing up near Vienna with the felonious intention of attaeking our approaehing bombers. The P-38s slipped up behind the enemy aireraft and in approximately two minutes slaughtered every one. It was elear that there eould

With a wingman covering each element leader, these Lightnings fly in battle formation to a target in Northern Italy.

only be 16 victories, but the total squadron claims exceeded 20. So the group intelligence officer collected a large blackboard and corralled all the pilots into the hot briefing hut where the entire aerial battle was reconstructed step by step and the claims adjusted to the proper number by general agreement.

The practice of attempting to ascertain total damage before evaluating individual claims is a good one. On a strafing raid you may be able to obtain a consensus from the pilots on how many columns of smoke were seen from burning aircraft or trucks when the shooting was over. On one of the group's many strafing missions in support of Marshal Tito's Partisans in Yugoslavia, a column of enemy motor trucks was attacked by the P-38s. Several pilots, who looked back at the completion of their many passes, counted about 15 columns of smoke from enemy vehicles. The group CO and most of the pilots, however, felt that a far larger number had been destroyed, and individual claims would have come to about twice the figure of smoke columns. Nevertheless, the S-2 section conservatively reported the results of the mission as 15 enemy trucks destroyed and an additional number damaged. On a mission over the same road the following day, pilots counted exactly 15 charred truck skeletons and wrecks at the site of the attack.

Gun cameras on P-38s provide some confirmation of claims but they are still far from perfect. Photo recon pictures also give a check on reports of dive-bombing results. Sometimes there is a pleasant surprise, as in the case of a dive-bombing mission which the group flew from its first base in southern Italy in the autumn of 1943. Returning pilots reported pessimistically that at the most only two or three bombs had landed on or near the target—the locomotive roundhouse at Skoplje, Yugoslavia. However, photographs taken the next day showed that by a fortuitous series of explosions and lucky hits, some 44 out of 47 locomotives had been destroyed or damaged by the P-38 attack.

Occasionally an entirely new problem will arise in interrogation. Once our group was stationed in Italy on the same airdrome with "co-belligerent" Italian fighter pilots. Only recently we had been attempting to shoot them down and vice-versa. On the spur of the moment and possibly a little vino, permission was obtained to run a little dive-bombing mission against an enemy ship off Greece with some dozen Italian fighter pilots in their Macchis acting as top cover for the P-38s. Fortunately the Italians experienced no lapse of memory as to the identity of their current friends and enemies—and the mission went off successfully. On its return, the intelligence officers struggled with their first—and last—effort to carry on an interrogation through the medium of an interpreter.

The whole object of interrogation is to produce concise and comprehensive reports on the mission for the higher echelons. First, material for a flash telephonic report giving the highlights of the mission is collected by the group intelligence officer or his assistant moving rapidly between the squadrons which are being interrogated within spitting distance of each other.

Next, when the squadron IO's have completed their detailed interrogation, all the intelligence officers foregather to coordinate on a more complete consolidated telephonic report to be sent off to Wing. These meetings are generally enlivened by a certain amount of banter and inter-squadron insults. One of the S-2s then has the tedious but important job of making up the final typewritten report which will stand as the official account and will cover every detail of the mission under various headings. It is forwarded to Wing as soon as possible.

In different units, S-2s have different jobs and do them all, rarely thinking any one of them odd. In one fighter group in Italy, it appears that the command section was quite enthusiastic about duck-shooting on a little lake near the Adriatic. It is reported to have been the job of the S-2

With Nissen hut for backdrop, P-38 pilots are briefed for mission escorting heavies.

—who was not averse to duckshooting himself—to arrange for any P-38 going up on a training flight to come over and buzz the reluctant ducks at one end of the pond so that they would fly over the expectant gunners waiting at the other end.

All in all, for the ground officer in the AAF who wants close participation in the war, S-2ing in a long range fighter group in combat provides just about as interesting, varied, satisfying, and time-filling a job as can be found anywhere in the armed services. ☆

Answers to "How Sharp Are You?" on Page 2

1. B-24. (Distinctive shape of fuselage, high wing and nose turret are distinguishing features.)
2. Yes. (You would be able to see part of its three-blade construction if it were not.)
3. Yes. (Nose turret mounts twin 50-caliber machine guns.)
4. Up.
5. True.
6. 227.
7. Four.
8. Corporal.
9. Microphone. (Mike is used for communication between control jeep and positions inside bomber.)
10. One.

THE BLISTER CLUB

(*Continued from Page 5*)

the area was filled with Nazis, but they kept the Americans hidden for eight days.

The two flyers were put under the charge of a 21-year old Frenchman who spoke no English. He boldly marched them right down the main street of the town, past the Nazis and into the railroad station. Here he bought tickets and they rode the train to Sedan.

"It scared hell out of us," the copilot explained. "We were riding as passengers with Jerries all around us. We got to Sedan and our guide took us to another house. We stayed at Sedan three weeks, changing houses every day or so. There were over 40,000 Nazis in the city but the French took us for walks in daylight. It was exciting all right, but not very comfortable.

"We wanted to get to Spain for we knew that we could then go on to Lisbon and home. We explained that to the French but they kept shaking their heads and telling us it couldn't be done. Seems our own planes were bombing too well and the railroad between Sedan and Nancy was out. Finally we had to agree to go to Switzerland.

"Fortunately, a couple of the French knew English and were able to explain what we were to do. Again we were escorted by the 21-year old Frenchman who took us by train to Paris where we rode the subway across town to another railroad station pretending to be Polish workers on the way to another job. The French every now and then eyed us and all the way through I had a feeling—and I've talked to a lot of the other boys and they agree—that the French generally knew who we were but never let on.

"Finally, we got on a ski train going south to the French Alps. We stayed in this very village for two and a half days. Then we were led to within a short distance of the frontier where we remained another 24 hours. The next night the French motioned us to get into a truck that was filled with empty wine barrels. We couldn't see where we were going as we had to keep well out of sight. Finally, the truck stopped, someone rapped on the barrels and we looked out.

"The driver jerked his thumb and we looked in that direction—the truck was next to a barbed wire fence. As we climbed out of the truck, the driver whistled and a Swiss guard came down and opened a gate. We shook hands with the driver and walked across into Switzerland."

A sergeant engineer of a Fortress was in the second Schweinfurt raid of October 14, 1943, when the 8th Air Force sustained its greatest loss of 66 heavy bombers but heavily damaged the target. Two engines were knocked out by flak and they dropped behind the formation waiting at their guns as the fighters came in to finish them off. They didn't have long to wait—soon the pilot called for them to bail out. The sergeant was one of the first out and he watched the others leave the smoking plane. He counted seven people, two of whose chutes did not open.

Not until he hit the ground did the sergeant realize that the jar of the chute opening had jerked his right shoe off. He looked about but the wind had separated him from the other four men. Knowing he was on the German border near Nancy, he went into a forest and spent the night.

The next day he found a small road and limped into a town where the French, who had watched the plane crash and the chutes open, were expecting him. He didn't speak the language, but by simple gestures signified what he wanted and they directed him to a shoe store where he purchased a new pair. After receiving clothing and food he explained that he wanted to reach Spain. The villagers pointed out the general direction and he started to walk.

In two days of walking his feet were so badly blistered he could go no farther, had a mixed feeling of dismay and relief when French police stopped him and took him in custody. They turned him over to the underground who hid him in a canal boat for a week until his feet were partially healed, and then he was taken to Verdun.

There he met three other AAF flyers who had been shot down on the same mission. After waiting four days at Verdun the underground took them in pairs to Belfort where they were turned over to a couple of French who guided them across the border and turned them over to the Swiss police.

Blood poisoning had begun in his feet and the sergeant was put in a hospital at Pourentry where in the next bed was the radio operator from his crew who was hospitalized with part of a 20 mm bullet in his leg. After four days the engineer's feet were healed and he went into town where one of the first people he bumped into was his copilot. This officer had broken some toes on his left foot in landing after his jump but refused to go to a hospital until he'd checked in at the Military Attache's, saying he had made it this distance in that condition.

A month later another officer of the crew showed up—the navigator. He told them that he had gone out to the wreckage of the plane with the French and had been with them when they buried the four crew members found in the craft. The people of the town of Toul had made a collection and put up headstones for the dead flyers.

One of the escapees, a lieutenant from a 15th Air Force Liberator, spoke fairly good French and made rapid progress through the underground. Within a week he was across the Swiss border without ever having been bothered by Nazis. Only one thing occurred that he thought worth mentioning:

"At one small house where I spent a day, the woman told me that her husband had been in the French Army, having been taken prisoner four years ago. She'd heard less than a year ago that he was still alive.

"She was a very nice lady and must have been pretty good looking before the war. Now her hair was pulled straight back from her forehead and tied in a knot behind her head and she would look at me with her large gray eyes not as if she saw me, but as if just behind me were occurring all the things she described.

Maquis guards border road. Previously, men of the Maquis guided allied aircrews into Switzerland.

"She was fixing me something to eat when there was a rap on the door. I guess I just froze. It was too late to do anything. The door was thrown open and there were a couple of Jerries outside. The woman walked over to them slowly and casually as if she'd been expecting them and as if I were part of the furniture. The Germans just pushed a piece of paper into her hand and slammed the door behind them. She came back to the table where I was sitting. I always will remember the way she moved. She didn't seem

to walk, but to glide along as if on wheels.

"We both bent over the sheet the Germans had given her. I could understand it easily. The Germans were offering a large reward for any enemy flyers turned in to them. They'd also release a Frenchman from prison camp for every Allied flyer they got. I guess I read slowly, for she was finished reading before I was. I looked at her. This time her eyes seemed to be focused on me as if she were seeing me for the first time.

"Then, with her eyes still on me, her hand reached out and picked up the paper. She crumpled it and threw it into the kitchen fire and went on fixing me something to eat."

Not all of the men traveled by themselves. One group of nine flyers from four different crews got together after being shot down in Belgium. They openly walked into Nancy and were not picked up by Germans because the industrial outskirts of Paris were getting bombed and the roads were full of refugees, many of them laborers from other countries.

Of that nine men seven got through and became part of ACRU but two were caught by the Germans—which seems to be about the average percentage for escapees. They were kept in Liege, Belgium, for almost two months and say it was like Chicago at the height of the Prohibition era with the Belgian Maquis operating exactly like movie gangsters.

The Americans went to football games, sports events, movies and cafes. They learned that each of the Belgian Maquis had a woman with him all the time. Generally it was a large woman with a Mae West figure. The slim type that is so popular in the United States was sneered at. "What use would she be?" the Belgians asked. "Can she hide a gun in her bosom? Some of our women can carry two guns there and the Nazis never search anyone but us."

Liege was the clearing point for all escapees from Belgium. Every one of the Allied soldiers received wonderful treatment and it was almost like being at a rest camp. If they wanted excitement they went along on some of the Belgians' expeditions to get fresh supplies and money from the Germans. One day the Belgians gathered the boys together, got them placed in advantageous spots in a corner cafe, and, after ordering drinks for them and being certain they were all right, left them there. In half an hour a German armed money truck rumbled down the street and stopped in front of the bank across the way. The whole thing was perfectly timed. They all remarked they felt as if they were seeing one of the early Cagney pictures. Without any fuss a couple of their Belgian friends sauntered up to the driver and guard, pushed guns in their sides, and in a moment the Germans and Belgians were back in the truck. They drove out to the country where the patriots removed the money at their leisure.

"You must not consider us unlawful," one of the Maquis was careful to explain. "I am an attorney and nothing pains me more than breaking the law. But we did not set up this government and the Germans do not belong here, handling our money and property. We take the money from them and use it to buy guns to shoot them so that we can again have our own government and be law abiding."

After a good deal of planning the Belgians explained their next raid to the men. It was to be a large factory and storage point in the outskirts of the city, but that noon all the Belgians' plans literally went up in smoke. A large formation of AAF planes wiped it out. The patriots were highly annoyed at this wanton destruction of German property when they had planned to do it in a much neater manner.

The next day travel began—practically in caravan. Not only were there nine flyers but they had a Canadian, an RAF pilot, and a U. S. Engineer who had been captured on D-day in Normandy. The Germans had marched him and 600 other Allied troops through Paris on D plus 22 and French collaborationists had hissed and slapped them. The Engineer escaped by jumping out of a box car with some English and Free French. He'd been with the FFI before joining the caravan.

Their guide was a 50-year-old Belgian woman who was making her second trip with escapees all the way across France to the border. As decoys she had a Belgian cripple and an old Belgian man. The flyers and the other escapees just tagged along, letting her do the talking for all of them.

By the time they reached the border they had added more men—two German deserters, and a paratrooper who'd been dropped at the wrong place and was highly annoyed about it. The biggest scare they got was when our own planes came over and raided factories near them. This occurred several times and the men agreed they never realized what bombing really meant until they were at the other end of it.

Although the trip to the border had been interesting and not without some amusement, the culmination was tragic. They were brought to the border at night and given careful instructions—the main thing for them to remember was that there were three barbed wire fences at this point. Singly they started out in the dark. But either the French were mistaken or the Germans had suddenly done something for after getting through three fences they were badly cut and hurt when they ran into another. An alarm was sounded. Most of them scrambled back to French soil and hid at a prearranged rendezvous.

At dawn they were able to count the barbed wire fences. There were five. A few of the newcomers were missing and one of the original nine was gone. The pilot who was the leader of the party decided that someone had to do some scouting to see if they could make it before the sun was too high and would permit no one but himself to do the job. They watched helpless when he was caught only 20 yards from them by a German patrol. Later they heard that he and the other man were prisoners. Finally the men found some French who helped them cross the border that night.

Without exception all the airmen who had escaped the Nazis talked about the magnificent aid they had received from the men and women of France, Belgium and Holland, whether the Maquis, FFI, Belgian partisans, Dutch underground, or just citizen patriots. The escapees could not put down the names and addresses of those who aided them for fear of reprisals in the event of their capture, but they remember almost every one.

For instance, the day after the men were brought out of Switzerland one of them—the first copilot mentioned in this article—was seen walking out of the village carrying all the chocolate, cigarettes, soap he could find. When he returned, he couldn't stop grinning he was so happy.

"Just 400 yards from here" he said, "is a house where a lady hid us for two and one-half days after we got off the ski train and were waiting to cross the border. Just now I walked down the road to thank those people. You should have seen the welcome they gave me! I told them about the others who got through. The woman and her son and daughter are coming to have dinner with me here tonight. I'm lucky. I'm able to at least thank one of those who helped me. I'd like to go back and thank every one of them —and maybe some day I will."

The next day they were taken to an airfield where they paid no attention to the 40 German prisoners working under the stern eyes of the FFI. They were too busy staring at the C-47 that stood waiting to take them out. Slowly several of them walked around the transport, and then one ran his hand along the underside of the wing the way a man does when he touches something he loves. Another escapee looked at him and nodded. "We're home," he said. ☆

The Enemy Is Listening

BY CAPT. ERIC FRIEDHEIM
AIR FORCE *Staff*

In combat zones, if you don't know your radio equipment, you may easily dictate your own death warrant

The Thunderbolts were nearing the target, a strategic railroad bridge deep in enemy territory. The ride had been uneventful; weather was holding and there had been no flak. In his cockpit, the pilot leading Red flight sang softly to himself.

Suddenly it happened. High out of the sun, more than a hundred Messerschmitts and Focke-Wulfs knifed down on the American squadron. Quickly the Thunderbolts jettisoned their bombs harmlessly into the fields below and tried desperately to fight their way out of the trap.

What had gone wrong? The mission had been planned exactingly to catch the enemy by surprise. Had somebody tipped off the enemy? Or was it pure accident that an overwhelming force of interceptors was on hand at the right spot at the right time?

Intelligence officers, reconstructing the debacle, soon determined it wasn't any accident. The Germans had been tipped off. Not by any spies on the Allied side. They received their information from the Thunderbolts themselves shortly after they had left their base. The information came from the pilot who was leading Red flight.

He had been singing ever since the squadron was airborne. Now there isn't any regulation prohibiting a pilot from singing while on a combat mission. But the rules are stringent about carelessness. The pilot leading Red flight had neglected to check his radio-telephone equipment and his voice was going out across the broadcast channel into the interested ears of the enemy. German monitors kept tuned to his transmission. By triangulation they found it a simple matter to plot the exact course of the Thunderbolts.

This is not an isolated case. Files in every combat theater bulge with reports detailing how failure to maintain radio-telephone discipline has resulted in disaster.

Proper use of radio equipment and standard operating procedure for R/T transmission are given considerable emphasis in the curriculum for pilot training. But a survey shows that many pilots, some of them seasoned combat veterans, pay little attention to R/T regulations. Many are unfamiliar with the radio equipment that is installed in their plane.

Communication between fighter aircraft is highly important in the teamwork of combat. But every word broadcast from one airplane to another can be heard by enemy listening posts. A few careless words may give alert monitors enough information to determine not only the route of the attacking force but also its strength and the purpose of the mission.

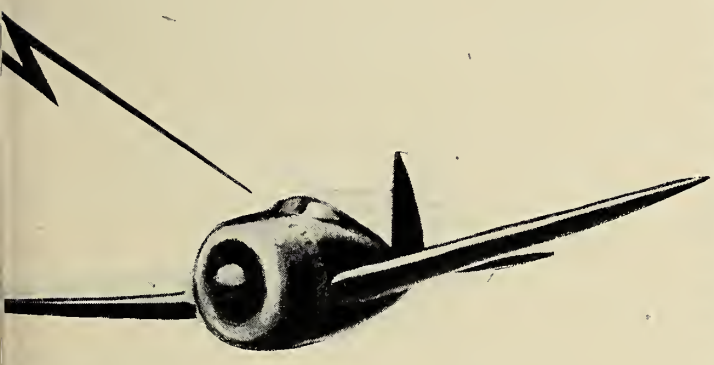
Listening in on R/T conversations is a major function of combat intelligence. The enemy listens to us and we to him. Frequently both sides are careless.

During the Normandy campaign our monitoring service picked up a conversation between a German ground controller and a Luftwaffe squadron leader. The controller instructed the squadron leader to take his flight to a certain Allied target. Our monitor immediately notified Allied fighter control. Within seconds word was flashed to a flight of Allied patrol planes to intercept the Germans. But the German listening post was wide awake. Hearing the instructions to the Allied intereeptors the Germans hurriedly told their planes to change course and return to base.

Capture of several German Air Force Signal Intelligence documents has shown that enemy knowledge of USAAF and RAF orders of battle and tactical plans is extraordinarily complete. Most of this information was gained through radio monitoring.

These documents indicated that the Germans had learned many details regarding the disposition of groups, squadrons and equipment at various airbases. In some instances they were able to appraise both the morale and operating efficiency of various organizations.

ILLUSTRATED BY T/SGT. DON BROCKELL



It was disclosed that the Germans not only paid close attention to R/T conversations during combat operations but patiently tuned in on all routine flights over England including training activities. By monitoring messages from cargo and transport planes the Germans also guessed at the location of principal Allied air supply bases.

From various intereepted transmissions, the enemy was able to draw many accurate conclusions regarding American and Allied air tactics. The Germans determined that early-morning weather reconnaissance flights were a reliable sign of combat operations during the day. Attempts by Allied bomber formations to shorten their time of assembly over England also were noted by the Nazi radio sleuths. Running comments by our bomber crews on Luftwaffe interception, flak and damage sustained by American planes during combat have been of considerable value to the enemy.

During the past few months, communications training officers of the First Air Force Fighter Command have been attempting to find out why fighter pilots, who ordinarily are most painstaking about flying and combat techniques, often heedlessly risk their lives by blabbing vital information to the enemy over their radios.

In the opinion of Capt. David W. Thomas, communications officer at Mitchel Field, who has specialized in the problem of R/T discipline, many pilots fail to grasp the fundamentals of radio telephone procedure. The results of a questionnaire given hundreds of pilots in Africa and in the United States back up his conclusion. This questionnaire indicated a widespread ignorance by pilots regarding some of the most elementary phases of R/T operations.

One typical group was asked what indication does the pilot have to show him he is transmitting when using the airborne SCR 522 radio. Thirty-three of the 67 pilots who were asked this question didn't know. The answer to this one is that the indicator light goes out.

Four pilots were stumped by the question: If, on a combat mission, you were told to observe radio silence would you turn your VHF Command set off? The proper procedure is never to fly with the command set turned off because you might miss some bit of vital information such as the warning that enemy planes are approaching.

Five pilots erroneously thought that a homing station operating as a single unit can give you both course and distance you are from the station.

Worst of all, two of the pilots taking this quiz, couldn't give the meaning of some basic R/T terminology as vector, angels, bogey, steer, mayday and cockerel.

Reading through the transcripts of R/T conversations in various combat theaters hundreds of security and discipline violations become evident. There have been instances in which pilots on their way back from missions talked about such matters as what they would do on their next 48-hour leave.

Army communication experts emphasize the importance of using R/T sparingly. When one man is transmitting no one else can break in. If someone is clogging the line with useless talk he may be shutting off someone else with an urgent message.

As a general rule, radio silence should be broken only when it is necessary to insure success of the combat mission. Excepted, of course, are emergency calls, such as a lost pilot requesting a fix to get him back to base. No information of value to the enemy should be passed over the air except by code. Transmissions should be kept to barest minimum to reduce the enemy's opportunity for making a "voice-fix."

Fighter pilots who have been flying as a group for a long time frequently lapse into the habit of calling each other by their names or forgetting to use the standard code words. This always is dangerous. Every airplane in every formation has an official designation such as Red flight one or White flight three. If a leader suddenly orders "Bill" or "Joe" to do something there may be confusion. It is possible that there are several "Bills" or "Joes" in the formation.

Sticking to the R/T code words also is important, particularly if our formations are engaged in joint operations with planes of Allied air forces. These words have been adopted and are understood by the airmen of all the United Nations.

Many Polish, French, Belgian and Dutch pilots in the RAF don't speak English. Deviation from the code words results in obvious confusion. Another advantage of code words is that they are designed, phonetically, to be understandable through operational noise.

No fighter pilot is foolish enough to take off against the enemy without his guns and a thorough knowledge of how to use them. His R/T equipment is a weapon of equal importance in modern aerial warfare. In the swift seconds of battle or the agonizingly long period of trying to get home alone, radio plays a paramount role. Familiarization with this equipment and its proper employment may spell the difference between life and death. ☆

THE FIGHTING 13th

(Continued from Page 18)

When photographs taken during the action were examined, the startling discovery was made that one of the battleships on which direct hits had been scored was the Yamato, Japan's largest and the pride of her navy. This was the first time it had been sighted and these were the first photographs of the Yamato. Through these photographs, corrections were made in our Navy drawings and in intelligence reports.

The fact that this method of bombing heavily-armed ships from an altitude of 9,000 feet was hazardous though effective was stressed again by Col. Oliver S. Picher, executive of the 13th Bomber Command. He pointed out that pilots on such strikes were reporting ack-ack the way they do cloud cover: "we have run into eight-tenths flak eover."

Another method of attack is used against ships of the Sugar Charlie class and smaller. This is performed by individual B-24 attacks at mast level. The technique is to circle outside the range of enemy ack-ack fire to observe the ship's speed, possible evasive action, firepower and the best axis of attack. The plane then turns away from the target and at a predetermined distance reapproaches, taking advantage of the sun, possible clouds or any other cover. The attack is made at a maximum of 40 feet above the mast.

The 13th Air Force is also adept at night shipping attacks. Constant sea searches are maintained by these B-24 snoopers which are able to detect their targets in the dark by means of electronic devices.

From attacking shipping to striking airdromes is an easy transition for the heavies. Often a mission that started as one is changed in flight to the other, due to last-moment tactical developments. Although airdromes have always been a high priority target in the Southwest Pacific they are extremely unsatisfactory. They are easy to repair and must be hit repeatedly.

Repeated attacks on Jap airdromes harboring aircraft that are harassing the Philippines operation is an unscheduled participation by the 13th Air Force. In the overall planning of the Philippines campaign, the 5th was designated the assault air force. The supporting assignment of the 13th was to protect the main line from a westerly flank attack and to guard lines of communications from the south until such time as they could be extended eastward. When urgent emergency requests came from the Philippine headquarters of the 5th for the 13th to strike at tactical targets in the active combat area, they were complied with immediately. Air cover, strikes by heavy bombers against shipping and other installations, knocking out of airdromes, sea searches, air-sea rescues, all have been part of the extra job taken on by the 13th.

In this phase of activity a medium bomb unit—the B-25s—played an important part due to their versatility. They had long experience in all types of bombing within their range, strafing and the dropping of para frags, mast-level shipping strikes, precision bombing from medium altitudes.

With the destruction of important Jap oil sources at Balikpapan and Tarakan, with its aerial onslaught on enemy shipping, with its active participation in the Philippines eampaign far beyond its original assignment, the 13th Air Force has come into its own.

It has never been a large air force but it is now growing. During its first phase of operations in the South Pacific, its bombers struck heavy blows at the enemy day after day and knocked out Rabaul; its fighters shot scores of Jap planes out of the sky during the time of these accomplishments. However, they were a part of the spectacular Navy show. Its job in the South Pacific done, the 13th moved over into the Southwest Pacific to join Lt. Gen. George C. Kenney's Far East Air Forces. Again it found itself in an auxiliary role.

This situation does not worry the 13th. In the words of its commanding general, Maj. Gen. St. Clair Streett, "Our job is to do what we can to help win the war, not to talk about it. We think we have done and are doing a good job. If we are, the credit --all of it—goes to the men who are doing the actual fighting, not just the aircrews but the men on the ground who not only do the dirty work but in their leisure time sweat out their planes and combat crews."

The men of the 13th have a tremendous pride in their air force. Like their general, they know they are doing a good job. As one GI put it: "We don't need publicity to prove it, but things can go too far, such as when my girl writes asking when the 13th is going into combat because, according to the papers back home, all the air fighting in the Pacific is being done by the 7th and 5th. Am I in a service outfit, she wants to know. And me in the fighting 13th. How do you like that?" ☆

Answers to Quiz on Page 42

1. (B) One of the Volcano Islands
2. (A) 60 miles
3. (A) True
4. (D) In Manchuria
5. (C) $60 per month
6. Army Air Forces Training Aids Division
7. (D) More than two and a half years after the Armistice, on July 2, 1921
8. (B) Red with a vertical blue stripe in the center
9. (B) 2,100
10. (A) January 2, 1942
11. Parallax error is that resulting from reading the instrument from the side, thus giving an untrue picture of the actual position of the indicator pointers
12. (B) German radar apparatus
13. (B) 24
14. (C) December 18, 1922
15. There is no 16th Air Force
16. (A) True
17. They are all located on the Philippine island of Luzon
18. (B) Traveling in an ATC plane
19. (B) Maj. Gen. Hoyt S. Vandenberg
20. P-59

Rendezvous

(Continued from Page 52)

Ratings for Superfort Radiomen

Dear Editor:

Some of the fellows graduating from this school each week are being sent to B-29 school for specialist training and assignment to B-29s. Most of these men are top students and really deserve the break—but:

We have heard both from men here and men assigned to the 20th Air Force overseas that the men assigned as radiomen on B-29s get lower ratings than men flying on 17s, 24s, etc.

If this is true, it leads to the idea that a lot of boys will let their buddies pull ahead of them in scholastic grades so that they won't go to B-29 school. It seems only logical to me that the men assigned to 29s, being better operators, should get at least as high a rating as the 17 and 24 radiomen.

How about it—do you think you can dig us up the true facts on the matter?

Pvt. Willard Andrews, Sioux Falls, S. D.

It is established that men with MOS 757, regardless of the plane in which they fly, are generally eligible for ultimate promotion to staff sergeant. The circumstances and speed of their promotion are, of course, left to their organization. But there is no discrimination among types of bombers.—Ed.

Engines vs Motors

Dear Editor:

How about straightening something out for some of your writers and many of the nonflyers among your readers? I have always been led to believe a motor is a machine run by electricity. A prop governor or a wheel retraction mechanism may be run by a motor, but a plane—never. Ever heard of a crew chief speak of a motor change? I think he would eall it an engine change.

Congratulations on your magazine. I only wish it were twice the size.

1st Lt. Paul D. Pattinson,
Gowen Field, Idaho

Although the dictionary makes no hard and fast distinction, AAF usage is certainly as you indicate. If we ever depart from it, both writer and proof-reader have been napping. Not to mention the editor.—Ed.

Those Wing Explosions

Dear Editor:

. . . I have seen airplanes, both American and German, shot down in large numbers over Europe. At least half of them went down because the fuel tanks exploded. "They blew up," we would tell the S-2 officers at interrogation.

High octane aviation fuel will burn in the presence of oxygen, but it will not explode. The real cause of the accidents was the mixture of gasoline vapor and air in the partially empty portion of the tanks, ereated as fuel was used up. This is substantially the same air-fuel ratio found in an engine cylinder, and all it needs is the "spark plug" of an ineendiary or tracer bullet to set it off.

In order to neutralize the formation of

this dangerous vapor without resorting to air vents in the tops of tanks, I think it would be possible to introduce carbon dioxide, helium or some other inert gaseous element or compound to expand and displace the fuel as it is taken from the tank. This inert gas should always be at atmospheric pressure or slightly greater to insure positive fuel feed to the engines and prevent collapse of the tank. Low pressure cylinders would suffice for this purpose, and as fuel is used up, a check valve would admit more CO_2 into the upper part of the tank. . . .

T/Sgt. Olin O. Dobbs, Las Vegas, Nev.

A very good suggestion. British and Americans in England have been using inert gases in their partially empty fuel tanks for some time. See "Reducing Wing Explosion Hazards" on Page 48 of the January Technique section.—Ed.

The Last Time

Dear Editor:

. . . Within the next few days I am to be separated from the service and I wanted to get this in while I'm still "military personnel."

During my tour in England I read AIR FORCE Magazine every chance I got and found that it helped me in very many ways. I'd like particularly to tell Maj. Luther Davis how much I admire his work. His invasion articles, which were about something I knew and could criticize from personal experience, were by far the most legitimate I have read on this subject—and that includes stuff by Ernest Hemingway and others. His piece in the last issue—about the sergeant with his own personal breeze—made all of us in the hospital laugh our heads off. For my money he's tops in writing. The various departments are all good. This Is Your Enemy I read often and think perhaps it saved my life.

If it's worth anything to you tell the boys who still haven't been overseas that for my money—and I guess I'm what you call a "veteran"—the most valuable thing they can read to fit themselves for combat is AIR FORCE Magazine. . . .

Tell Major Davis that on the strength of his piece I tried to get into B-29s (*The B-29 and You* by Maj. Luther Davis, your October issue) but they wouldn't have me on account of my health.

Paul L. Dowd, Captain, Air Corps,
New York City.

P.S.: I guess this is the last time I'll sign myself that way. So long.

So long. Best of luck.—Ed.

PICTURE CREDITS

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SAVE THAT CHUTE!

It can get you out of a tight spot on the ground as well as in the air

After a bail-out or crash landing—save your parachute. It can clothe, shelter and help feed you and it can serve as a rescue marker. It can be adapted for more uses in an emergency than any other single item of flying equipment.

From the nylon canopy, the shroud lines, harness webbing, canvas, felt and rubber seat pack, metal harness buckles and rip-cord pins, a survivor can make sandals or boots, snow shields, sea anchors or sails, fish hooks, blackjacks and sling shots. From all over the world have come reports of ingenious uses of parachute equipment by airmen who have returned from desert sands and arctic blizzards, jungle swamps and watery wastes, because they saved their chutes.

One wide-awake sergeant tried vainly to attract attention of planes flying overhead, then touched a match to the rubberized horse-hair chute cushion. The dense black smoke led a searching party to his rescue.

A pilot tied together the harness buckles and successfully kept up his food supply by killing small animals with his homemade blackjack.

In the CBI, a wounded airman was carried through swamps and jungles on a litter constructed from bamboo stalks and the nylon canopy.

For walking sandals, the seat-cushion rubber can be cut to the shape of soles; the canvas pack case is cut into strips for tops and sewed on with the inner threads of shroud lines, heel straps are made from the harness webbing. Such a sandal particularly facilitates desert hiking.

In the arctic regions, three or four layers of nylon make an ideal wrap-around for mukluk snow boots when cut into 30-inch squares and folded around the boot like a diaper. Part of the canvas pack can be used as an outer shoe, utilizing the shroud lines as lacings to hold the warm, flexible and wind-resistant boots to the feet.

For protection against snow-blindness, a two-and-one-half inch strip of the black felt from the seat cushion cover can be fashioned into a mask. One-eighth inch eye slits are large enough for vision, small enough to protect against glare. Elastic cord and hooks from the chute pack hold the mask over the eyes.

Shroud lines, when strung on a frame of boughs, make satisfactory snow shoes.

When winds are favorable at sea, the canopy can be used as a life-raft sail; when winds are unfavorable, a sea anchor can be made with the chute cloth and metal from seat or back pack.

More than 50 uses of parachutes have been evaluated by men of the Arctic-Desert-Tropic Branch of AFTAC at Orlando, Fla., and of the Personal Equipment Laboratory at Wright Field.

Best-known uses of parachutes in emergencies are as shelters—parafly, paratent, paratepee. When fires are burned inside the shelters at night, the shelter will radiate a white light which facilitates aerial spotting by rescue planes.

Other important, but not commonly-known uses of the parachute equipment for survival include:

(1) A simple sling-shot made from a "Y"-bent tie-rod or other metal bar, elastic cord and harness webbing or canvas for pellet holder. With practice, small birds, rabbits and squirrels can be killed.

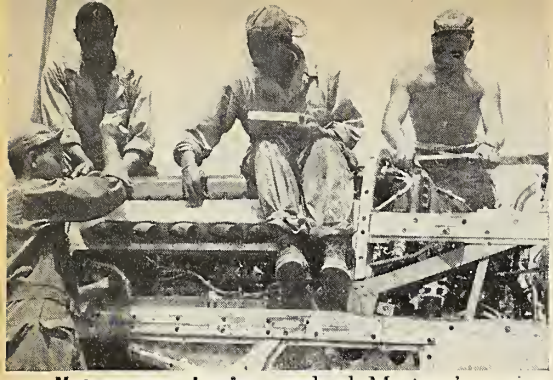
(2) The single wire strand from the rip-cord makes an ideal wire snare which can be set on animal trails.

(3) Fishing seine and hand nets are easily made with nylon, poles and heavy wire from parapack.

(4) The sponge rubber seat cushion can be used as a life preserver; will keep a small man afloat for hours.

(5) The 24 shroud lines can be used for tying and lashing or as lifelines. Cut open, the shroud lines are made up of 7 to 9 corelines which can be used for sewing clothes, weaving or as fishlines.

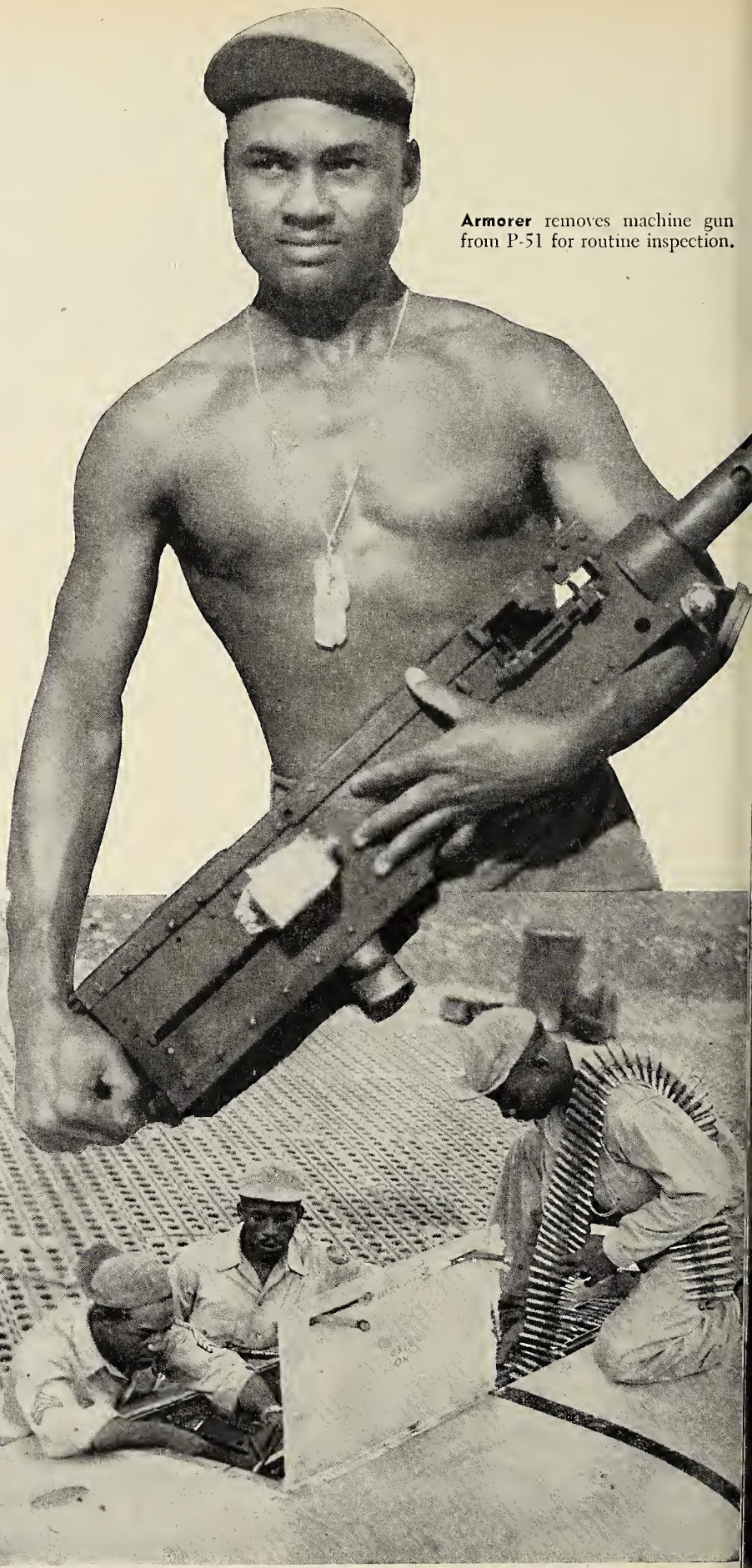
Whether the chute is used as a knapsack, for bandages, for map-making or for barter with the natives, it can be a survivor's most valuable possession in any part of the world. Never abandon it, keep it with you always for it can save your neck in more ways than one. ☆



Veteran mechanics overhaul Mustang's engine.

Group commander briefs his men before mission.

This pilot was hit by Nazi flak while strafing.



Armorer removes machine gun from P-51 for routine inspection.

Sergeant armorer and his helpers pack 50 cal. ammunition into a Mustang's wing

MAAF's 332nd

The 332nd Fighter Group has been flying high, wide and handsome in the Mediterranean Theater since April, 1943, when the first squadron was formed from pilots fresh out of U. S. flying schools and pressed into the Tunisian campaign. They flew P-40s then, but during the course of other engagements—Pantalleria, Sicily, Anzio, Salerno, Cassino, Rome—they have flown every type of fighter plane except the P-38. At present, they are piloting Mustangs, marked with red on rudder and stabilizer.

There is still a handful of men in the outfit who participated in the first African missions, but most of them came over in January, 1944. All newcomers get twenty hours' flight training: five one-hour solo familiarization flights, ten hours of formation flying at different altitudes, with and without wing tanks, and five hours of miscellaneous flights including rat racing and navigation. In addition, the flyers get a complete course that covers power plant, gas consumption, armament, emergency landing gear procedure, logistics on weight distribution and other technical data.

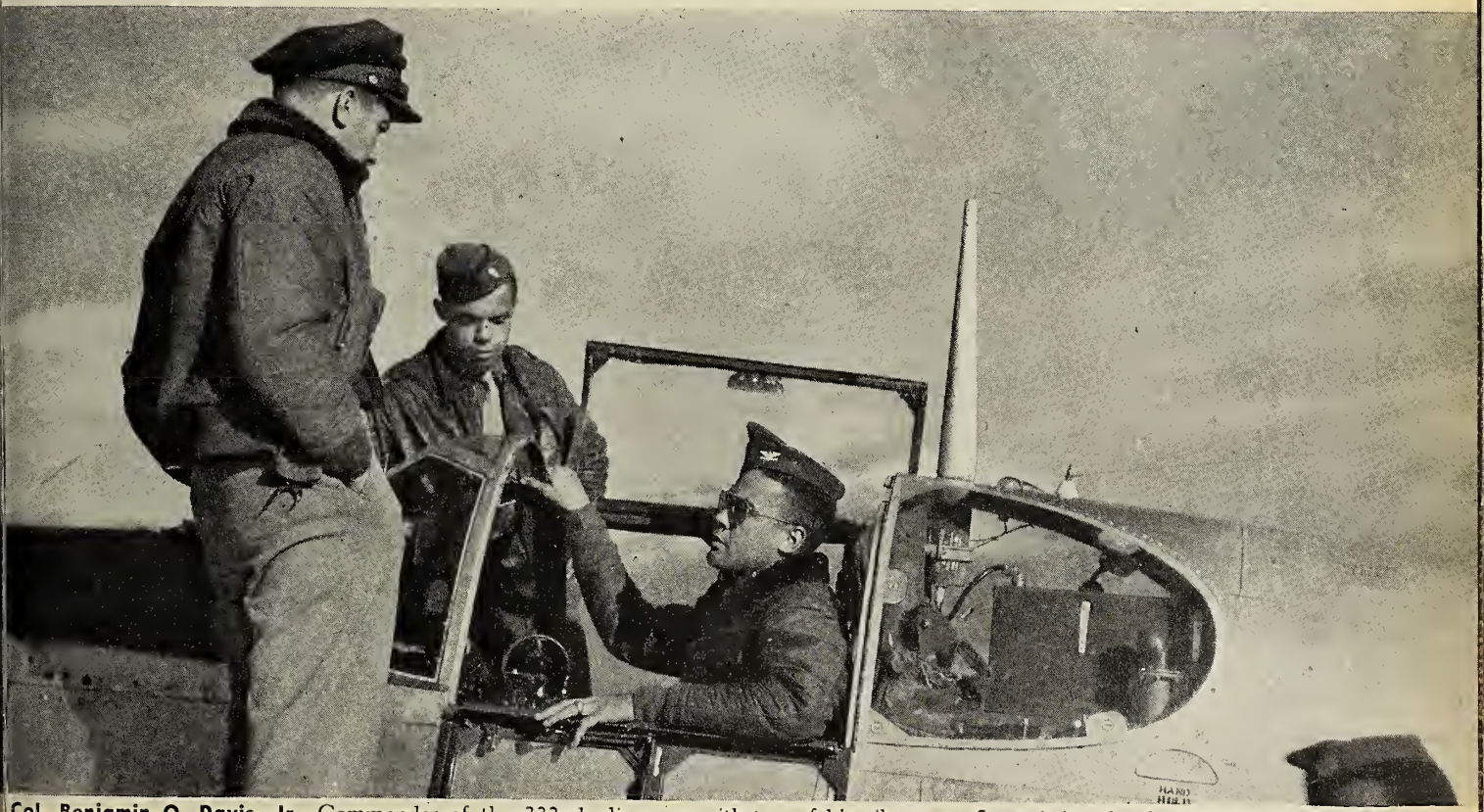
The ground crew has had to be on its toes as the group switched from P-40s to P-39s to P-47s and then to P-51s. The toughest job was changing from the inline engines of the P-39s and P-40s to the radial engines of the P-47s.

Most of the flights now are long range escort missions with an average time of 5½ hours at 30,000 feet or better, and they have taken the 332nd's "Red Tails" over almost every country in Europe. Many of the men from this group who are being returned to the U. S. for rotation are going to a new medium bomber group that is now in training under Col. Benjamin O. Davis, Jr., former CO of the 332nd. These men coming back are proud men, proud of the record of their group and their own personal achievements. For example, during the recent ten-week period, the "Red Tails" destroyed 170 e/a on the ground and 58 in the air. No wonder they're proud. ☆

Target for today is explained by Lt. E. Gleed.

These members landed with 3 min. gas supply.

Cannon hole is inspected by Capt. A. McDaniels.



Col. Benjamin O. Davis, Jr., Commander of the 332nd, discusses with two of his pilots a strafing mission that he has just completed.

SHOOTING THE BREEZE

GOT ANY GOOD STORIES? SEND 'EM IN!

France. Some air force officers were billeted in a chateau about five minutes' walk from their airfield. Every day for a week they had walked to and from work across a farmer's field. Then one morning they were confronted with signs which covered the entire area: "STAY OUT! ENEMY MINES!"

Much correspondence with a nearby bomb-disposal detachment finally brought a crew with mine locators, who could find nothing after combing the field. However, they wanted to be on the safe side so they dug up every foot of the suspected area.

When the bomb-disposal unit started away the old Frenchman ran after them, pleading, "Please leave me the signs. Maybe if I put them up next year kind Americans will again help me plant my vegetables."

China. A sad-faced coolie approached the boss engineering officer on an airdrome construction job and said he had a complaint to make. The GIs, he said, were not calling him by his proper name. He was afraid his venerable ancestors would be displeased.

"Well," said the engineering officer, thinking it was probably nothing more than a case of occasional profanity, "what do they call you?"

"Melican soldiers allatime call me 'Sneeze'."

"Sneeze? What's your Chinese name, for gosh sakes?"

"Ah Choo," said the coolie sadly. "Ah Choo!"

Utopia. A crew chief in this theater had a very intelligent little dog with a high degree of mechanical aptitude. The dog hung around the hangars all the time and in his off moments the chief taught him to check landing gear, make preflight tests and taxi a plane out to the hardstand now and then.

He was a modest pup and didn't ever get swell headed over the things he had learned. One day the crew chief was working on the steering apparatus of a fighter craft when he accidentally dropped the stick to the hangar floor.

"Bring it to me," he said to his dog, pointing to the steering apparatus.

"Hell's fire," replied the pup, looking up from a hydraulic job. "That's too much. Who ever heard of a dog retrieving a stick?"

USA. The hazards of training were frightfully exposed recently by the eagerest of several gunnery students who had just finished their first air-to-air firing and were having a bull session with their instructor, a tech sergeant who had come back to the states after 89 missions in Europe.

"I really liked that," one bright, shiny student said. "I hope combat will be as exciting." The veteran looked at him with a pickerel eye and said, "It will be." "But one thing has been bothering me," the kid said, "what was that long round thing trailing the plane we were shooting at?"

England. After investing three dollars in a slot machine at an officer's club here, a major studied the one-armed bandit for an idle moment and, feeling sorry for himself, decided that other guys have all the luck. He could visualize a two-star general walking up to the machine, putting in a single quarter and being deluged with the jackpot —including his hard-earned three bucks. The major was slightly pacified when he found a small sign above the bandit. It read: "In case of air raid stand near this machine. It has never been hit."

India. A crew chief came hurtling out of a B-24 he was servicing. "There's a cobra in there!" he gasped.

Snake experts and cobra fanciers gathered around and someone serewed up his courage and entered the plane. After a few minutes he came out to report that he had encountered no reptile, but had no intention of crawling through the narrow places.

The British in the area were consulted and they bucked the matter to some Indian civil servants who provided a mongoose. This ferocious beast, perpetually angry with snakes, was hoisted into the B-24 and all hatches closed. He finally emerged, snakeless.

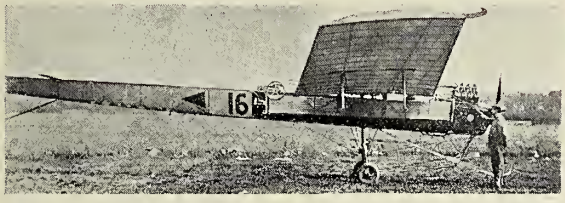
Three days later the crew chief who had discovered the cobra originally came down with a case of screaming-meemies. He was found huddled in his bunk, babbling about a snake in his boots. The cobra scare was immediately put down as a figment of the crew chief's imagination, and the B-24 flew three missions before a thoroughly frozen cobra was found behind some ammunition boxes in the waist. That night a further examination revealed a small sand snake in the crew chief's boots. Next day the crew chief was rescued from the psychiatrist, promoted to master sergeant and transferred to a reptile-free area.

What do you think of that? ☆

THE ALBUM

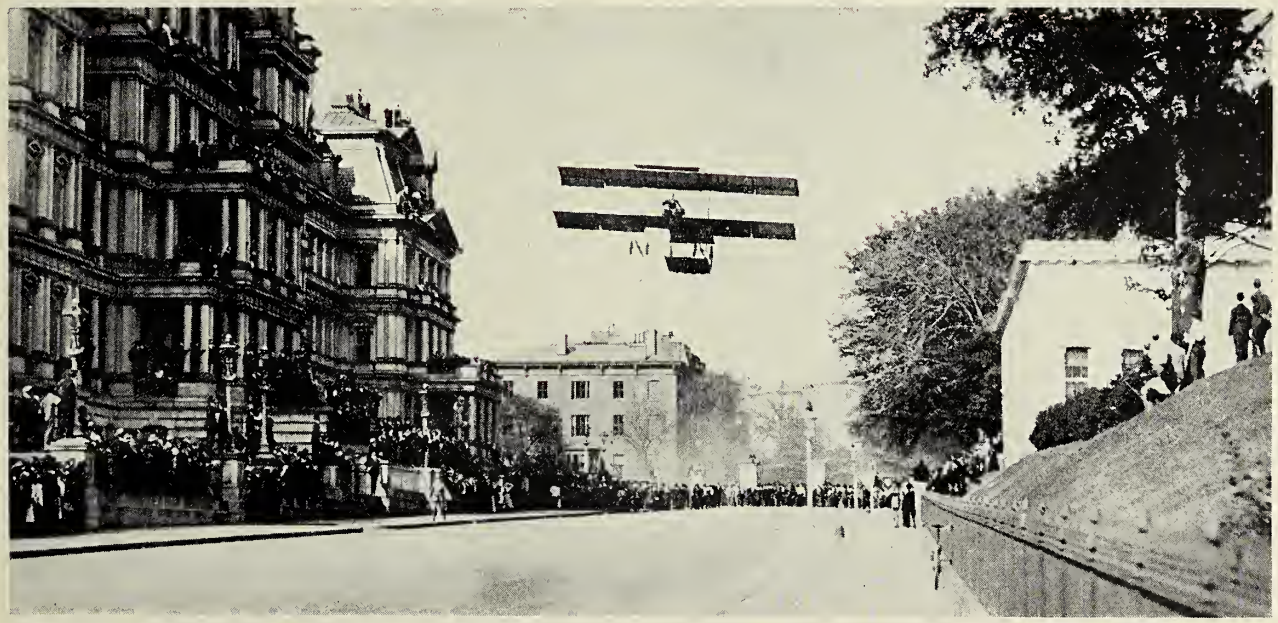
1910. Boston put on its best bib and tucker for this flying meet which was the first of its kind. Claude Grahame-White is shown doing his stuff for the ladies.

1911. A couple of buddies are about to shove Jules Vedrines into the Paris-Madrid race. In 1912 Vedrines set a new world's record of 105 mph in a U. S. meet.

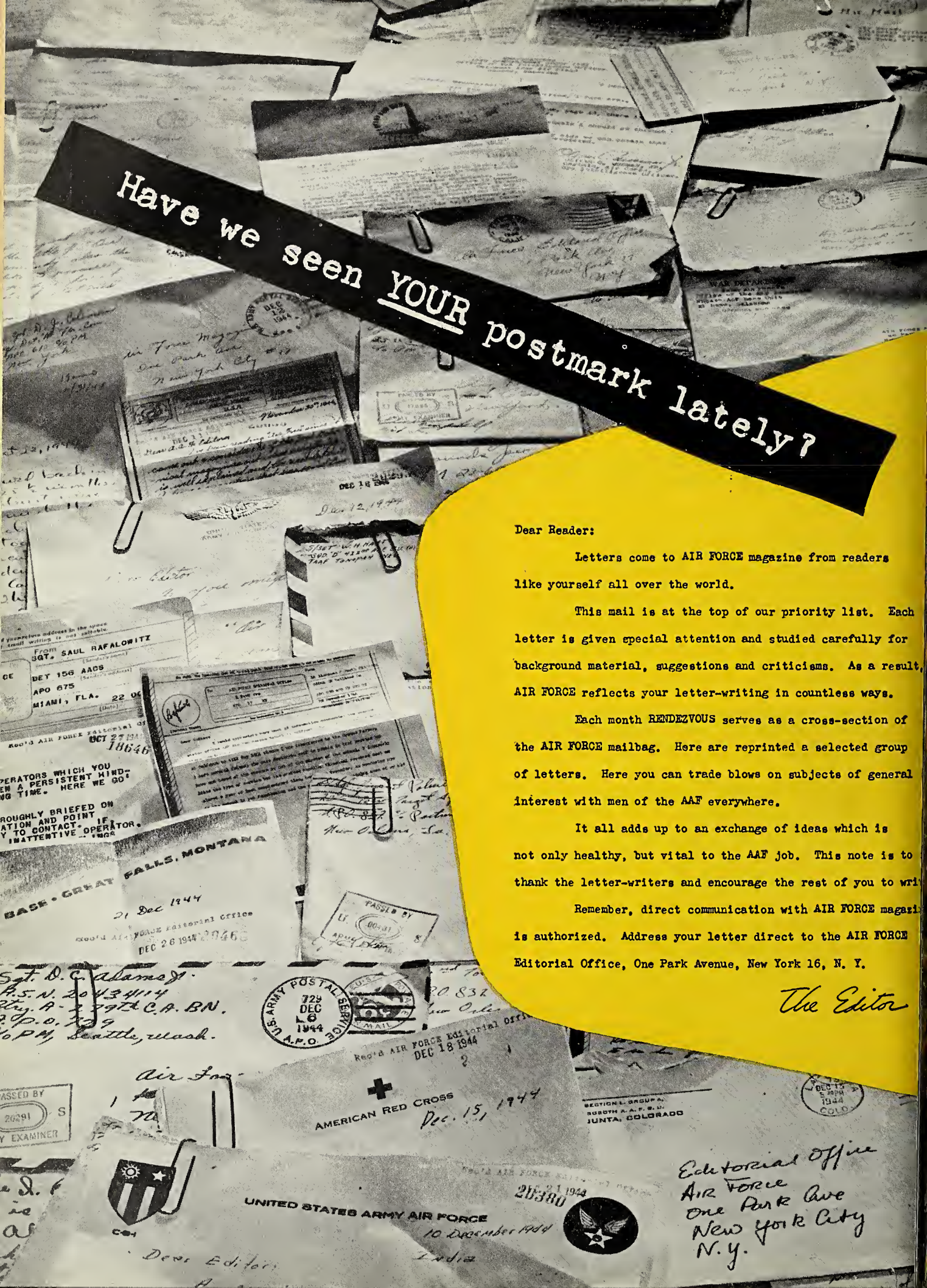


1910. Looking like a frustrated mosquito, this flying sliver, known as the Antoinette, was the dream child of Hubert Latham who flew it in the Belmont Park meet.

1912. At a time when everybody was looking for a good five cent cigar, a Mr. Gallaudet entered his 100 hp "Bullet" in an aero show at Grand Central Palace.



1912. Here is Claude Grahame-White again, this time hovering over Executive Ave., Washington, D. C., in a Farman biplane. Mr. Grahame-White was not running for any office but just thought it would be a nice idea to drop in on President Taft.



Dear Reader:

Letters come to AIR FORCE magazine from readers like yourself all over the world.

This mail is at the top of our priority list. Each letter is given special attention and studied carefully for background material, suggestions and criticisms. As a result, AIR FORCE reflects your letter-writing in countless ways.

Each month RENDEZVOUS serves as a cross-section of the AIR FORCE mailbag. Here are reprinted a selected group of letters. Here you can trade blows on subjects of general interest with men of the AAF everywhere.

It all adds up to an exchange of ideas which is not only healthy, but vital to the AAF job. This note is to thank the letter-writers and encourage the rest of you to wri

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The Editor

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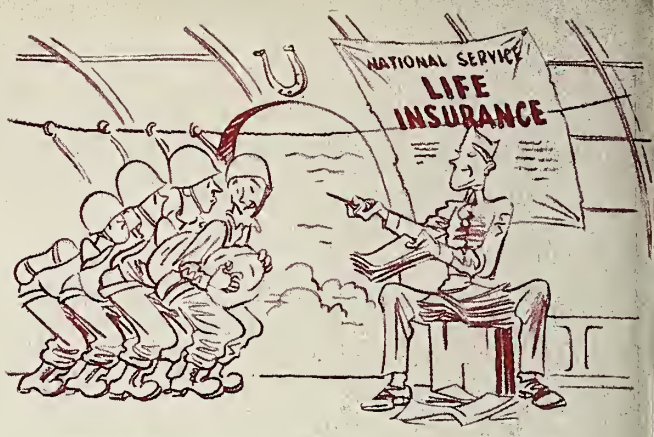
GLIDER PILOT—"G Stands for Guts", page 10

"Oh, landing obstructions don't bother me much. I used to drive a hack back in Brooklyn."



"He calls it 'Point of Sale Merchandising'."

Troop Carrier

by CAPT. WM. T. LENT

"Gosh, I'll bet the CO will be glad to know our supplies have arri

"Thank God, we're out of that flak!"

"The general got the idea from a circus act he saw back in 1939."

Rendezvous

Transfers to the Ground Forces

Dear Editor:

We are having many discussions and varied opinions concerning the recent transfer of Army Air Forces personnel to the Army Ground Forces, and would like to hear from you on the subject.

Are AAF personnel who have served overseas and are now back in the States on replacement, subject to this transfer? If so, I am sure that on hearing of this injustice, the morale of AAF men overseas will drop at least 50 percent. We have here men who have served over two years with AAF combat units, who, I am sure, would prefer returning to combat duty with their branch of service to being transferred to any Ground Force Unit.

If there are any regulations, rules, letters, etc., covering this matter, we would very much like to hear from you.

Sgt. Chester R. Jeffries, DeRidder, La.

Except in cases where it is unavoidable, it is the policy of the AAF that no returnees who have served overseas during the war in an active theater will be transferred to the Army Ground Forces.—Ed.

Chinese Rumor?

Dear Editor:

I have been given to understand that the Chinese Air Force has inaugurated a policy of completing the training of eliminated aviation cadets, and then inducting them into the Chinese Air Force.

Do you have any information on this?

Cpl. William P. Quinn, Denver, Colo.

The rumor that eliminated aviation cadets are being trained by and inducted into the Chinese Air Force is without foundation. —Ed.

Service Pilots' Ratings

Dear Editor:

Can graduates of Advanced Army Flying schools obtain Service Pilot's ratings upon obtaining the requisite experience in Military Aircraft or must the experience have been obtained in Civilian Aircraft?

Maj. Ernest C. Burghduff, Dayton, Ohio

See Questions column on Page 39.—Ed.

Two Men's Lives

Dear Editor:

I have a suggestion that has saved two men's lives on my crew. I'm the engineer on a B-17G, the best heavy in ETO.

Using control cables that have been discarded, I've braided two snap hooks on each end, one fastening to the chest ring on the harness and one to the chute (chest packs only). The gunner can always locate his chute in case of a collision, etc., and can snap it on in a hurry.

T/Sgt. Robert G. Farver, APO 559

Headquarters says you deserve a pat on

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AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

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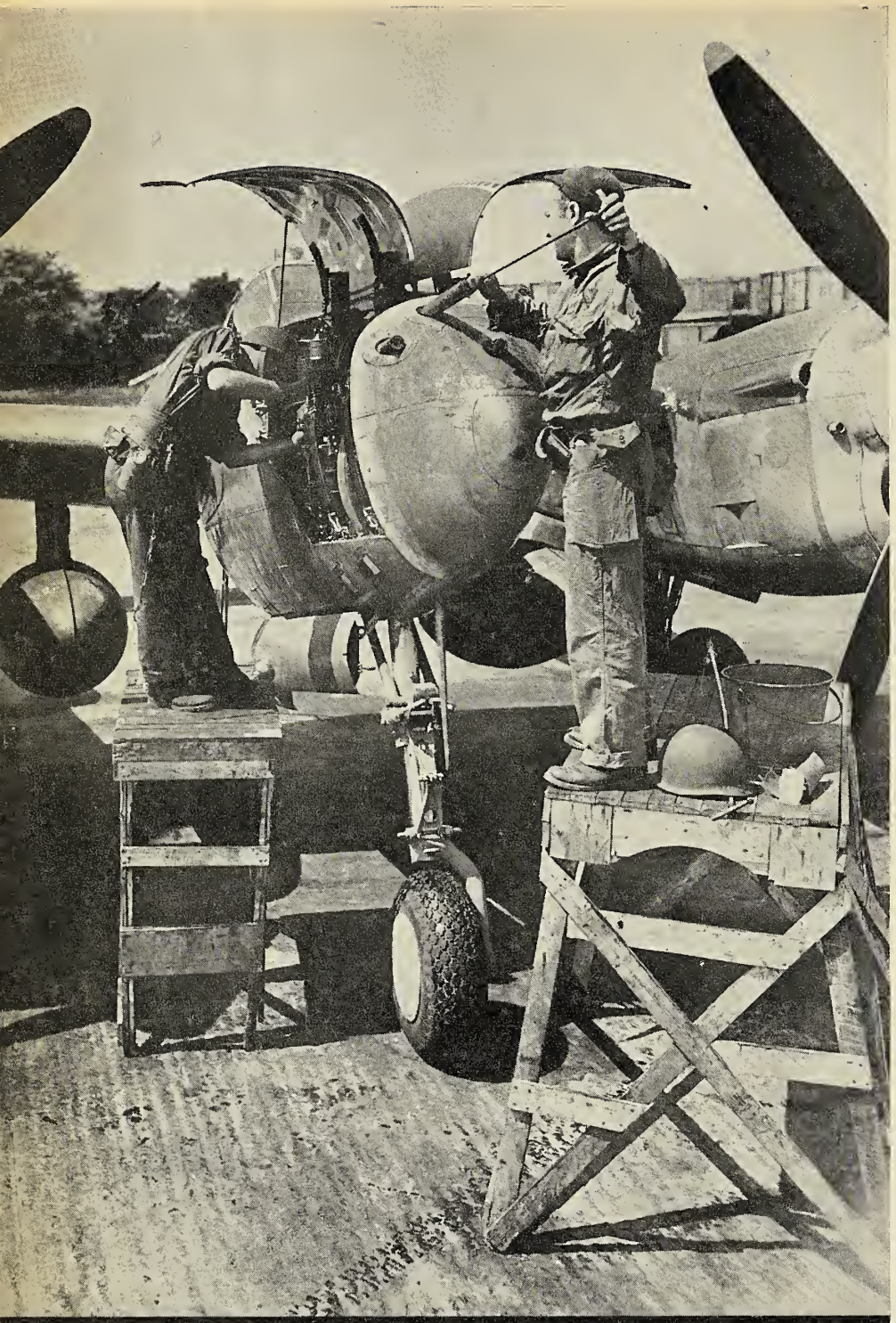

How Sharp are YOU?

You've got 60 seconds to paste your peepers on this pic and find out for yourself how many of its details you can remember. You'll discover it's not so simple as it looks when you turn to Page 45 and try to answer the questions you'll find there. Score 10 for each correct answer. 100 is perfect. Ready . . . go!

HOW SHARP ARE YOU? Turn to Page 45

Rendezvous

(Continued from Page 1)

the back for your ingenuity. They add that new heavy bombers will soon be equipped with racks to do this same job.—Ed.

Sharpies

Dear Editor:

. . . The sharpies who make up the quiz "How Sharp Are You?" should practice a little on AIR FORCE itself. Your January edition uses an illustration in the article "Into Hidden Valley" captioned "a C-47 coming into land . . ."

Well, that speedball in the cockpit is landing wheels up. Furthermore, he took the wrong airplane because he's actually in a C-78 . . .

Lt. Lane Beatty, Turner Field, Ga.

P.S. Did he make it?

Dear Editor:

. . . I hope the crash crew was standing by . . .

Sgt. Jack W. Crockett, Herington, Kan.

Dear Editor:

. . . You have slandered one of the finest aircraft now in service. As an old, old AT-7 pilot it hurt me deeply to see the AT-7 pictured thereon called a C-47. In closing, let me say Tch, Tch, Tch! . . .

Lt. Tom L. Heffner, San Marcos, Texas.

Dear Editor:

. . . If that is a C-47, I'm a P-38. Are you sure it isn't a C-78 or some other Beech-made aircraft? . . .

Lt. Henry Scheingold, Monroe, La.

Dear Editor:

. . . It is the opinion of this office that the plane in the picture is a C-78, and if we should prove to be wrong we are willing to eat the tail surfaces . . .

Sgt. Leo H. Hoder, Spokane, Wash.

Dear Editor:

. . . To me it resembles a C-45. "Is it is or is it aint?" . . .

Sgt. Jess L. Lowery, Alexandria, La.

Dear Editor:

. . . If the airplane is a C-47, I'll eat crow . . .

Maj. Waldo C. M. Johnston, Millville, N. J.

To readers Beatty, Heffner, Crockett, Scheingold, Hoder, Lowery and Johnston and a host of others who have jumped us on this one: It's a C-45 and it's buzzing the field, not landing. Our cx-caption writer says he is not happy in his present work.—Ed.

Battle Jackets Again

Dear Editor:

There is a group of officers, returned from combat, on the airbase where I am now stationed. We have a problem on our hands and we can't decide whether it can be called a gripe, or what.

The situation is this: While overseas in the ETO we were authorized to wear an article of wearing apparel known as a "Battle Jacket." It was considered as class "A" winter uniform, and a lot of officers

went to the expense and trouble of having jackets made.

Since returning to the States, we have been informed that these jackets are not authorized as part of our uniform.

What we would like to know is have we just thrown our money away?

1st Lt. Joseph L. Messer, Jr.,
Gulfport, Miss.

As indicated on Page 23 of our January issue, the jacket may be worn. (WD Cir. 391, 1944.) However, there has since been an amendment (Sec. IV Circ. WD No. 1, 1 Jan. 45) which changes the picture somewhat. The original purpose in authorizing the wearing by officers of wool field jackets (dark shade) was to permit the wearing of such jackets by officers who had purchased them overseas. The effect of the new amendment is to withdraw the authority to purchase dark shade jackets hereafter. In order to insure maximum conservation of materials, however, officers will be permitted to purchase the dark shade jacket until the present stock is exhausted, and will be permitted to wear such garments until worn out. Thereafter, officers will confine their purchases to the regulation wool serge jacket, shade No. 33, same as for enlisted men.—Ed.

Thunderbolt's Powerplant

Dear Editor:

Could you tell me if the P-47 (Thunderbolt) ever had an inline engine?

S/Sgt. V. Palmieri, APO 832

According to Republic's production manager, no Thunderbolt has ever had an inline engine, although an experimental plane in early 1941 used a V-type engine.—Ed.

The Voice of Experience

Dear Editor:

Here are our gripes. Concerning pilots: 1. They don't fly close formation. Because a new pilot doesn't see fighters for five or six missions he gets lazy and doesn't keep his ship tucked in. Then one day the group gets hit and a squadron with ships out of position doesn't come home. 2. They don't fly airspeed as well as position on bomb runs. Too often a ship will lag a little on the run and to catch up the pilot applies power, and just before 'bombs away' the ship is in a nose-high attitude in order to keep from overrunning, or the ship is indicating excessive airspeed in a level attitude. In any event, the bombs are thrown over the MPI. Use plenty of rpm on bomb runs and fly throttle formations, not turbo knob. 3. Pilots don't keep their crews informed on what is going on.

Copilots. 1. They don't accept their share of responsibility. 2. They don't know their airplane. 3. Gripe about being copilots.

Gunners. 1. Gunners don't keep on the alert during a mission. We led a squadron once that had its low element shot away without returning a burst. 2. Gunners either don't call out incoming aircraft or else call out every friendly fighter in the sky thus overworking the interphone and bothering the navigator, bombardier, and pilot on runs.

Navigators. A lot of navigators can keep

(Continued on Page 57)

In This Issue

The glider pilot on the cover this month is Flight Officer William Preus of Verona, N. J. He is 22 years old, holds the Air Medal with Oak Leaf Cluster, and wears battle stars on his ETO ribbon for the Normandy, Southern France, and Holland invasions. His glider was shot down in the Holland push. His wife lives in Verona and his mother, Mrs. Katherine Preus, is foreman in a war plant in Waltham, Mass. For the low-down on glider pilots see "The G stands for Guts" on Page 10 of this issue.

The photograph of Preus was taken by our staff photographer, T/Sgt. Roger Coster, who was also responsible for the Flight Nurse cover last October and the Jet Crew Chief cover in January. Coster has just shoved off for the ETO where he will cover as much of the war as is possible for one small man with a camera. The fact that he is a native Parisien who once served in the French Army will probably be no handicap.

With Coster as Overseas Correspondent went Capt. Eric Friedheim to report activities of the 8th and 9th Air Forces. Friedheim's article "The Enemy Is Listening" appeared last month. He is co-author, with Sgt. Samuel Taylor (who wrote "Portrait of A Crew Chief"—remember?) of a book scheduled to appear shortly under the title "Fighters Up." It will be Friedheim's second tour in the ETO; his first lasted well over a year.

To the Pacific, meanwhile, went Majs. Tom Hardman and Milton Krims. Krims, who had more than a year with the 5th Air Force as boss of a combat camera unit, is heading for Saipan to cover B-29 activities. Hardman goes to the Philippines to replace Maj. Herb Johansen (see "Banzai at Burauen," Page 4) who just returned, full of tall tales and the color of an old saddle from sun or atabrine or both.

Speaking of Saipan, Johansen brings back the report of the B-29 that returned from a strike over Japan with both engines on one side out of commission. Flak damaged one engine so badly that the prop flew off and knocked out the second engine. For a thousand miles the crew nursed the Superfort along, expecting momentarily to have to ditch. But she kept flying, and when they got back to base the pilot was so proud of her and had so much confidence that he didn't even bother to call for an emergency.

Our correspondent in India-Burma, Capt. Larry Bachmann, who wrote "Blister Club" in our last issue, is also full of B-29 stories. He tells of a Superfort returning from Singapore with one engine knocked out and bomb bay doors stuck open. After much conversation on the radio their CO at Group Headquarters advised them to ditch, but the pilot — a little irritably — pointed out that he couldn't ditch with his belly gaping open. It looked like a bail-out, but at the critical moment another B-29, which was flying the Hump with a load of gasoline, cut in on the command frequency saying that he was the regular pilot of the troubled Superfort—and gave advice on how to close the bomb bay. The doors were closed according to his instructions which were relayed by Group—and the B-29 landed at Akyab on a field officially considered too small for peashooters.

In connection with the super-ruggedness of our Superforts see the article on Page 29 which has something to say about the relation between design and performance. This article, called "Design—Key To Air Superiority," is a good example of the work of our lay-out genius and art director, S/Sgt. Seymour Robins, who did the same service for "AAF, Official Guide To The Army Air Forces." In civilian life he was art director for all promotion for the Hearst Magazines.

Another civilian star is S/Sgt. Mark Murphy, also of our staff, whose latest report from ETO, "Tac R," appears on Page 13. Once a frequent contributor to The New Yorker, Murphy has become this magazine's expert on jeep trouble. Almost all his letters begin, as did his last, with an involved dissertation on the state of his jeep: "I am in Belgium waiting for my jeep to be repaired. This time it was climbed over by a six-by-six truck. No one hurt, but the jeep mangled." He promises an article on jeepery for a future issue.

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Because of the many requests for personal copies of AIR FORCE, the official service journal now is available by subscription. The present system of bulk distribution to all AAF units, which provides that each copy of AIR FORCE be shared with several readers, will be continued without change. In addition, you now can receive personal copies of AIR FORCE at your Army address or have them sent to your home. The personal copies may be obtained by writing direct to the Superintendent of Documents, Government Printing Office, Washington 25, D. C. The subscription rate for 12 monthly issues is $2.00; single copies, 20c. The same rates apply to APO or Fleet Post Office addresses. Remittances must accompany all orders.

When Jap paratroopers dropped on Leyte, some of our so-called chairborne troops showed they could be plenty tough in a fight

BANZAI A

BY MAJ. HERBERT O. JOHANSEN

Air Force Overseas Staff

"Two men, isolated in the tower, gave a running account as the crazed Japs hacked at gas drums, shot off flares in a mad orgy of destruction."

By the end of the first week of December, 1944, the 5th Air Force was firmly established on Leyte in the Philippines. Its headquarters at the town of Burauen was functioning smoothly. No one in headquarters considered it remotely possible that a horde of fanatical Japs could appear out of thin air. Yet that is precisely what happened.

It all began around dawn of Wednesday, December 6.

The Negro cook of an aviation construction battalion, located on the Dagami road about a mile north of 5th Air Force Headquarters at Burauen town, was preparing breakfast, frying some precious locally purchased eggs. He heard some shots outside and shouted in an annoyed voice for the boys to "quit dat foolin' around." A moment later, instead of GIs, he saw a group of Jap soldiers armed to the teeth sneaking up on the mess hall.

The cook grabbed his M1 rifle, leaned it on some piled ration tins, and fired. When there were five dead Japs lying just outside the kitchen, he turned back to his stove. Then he lost his temper: the eggs were burned beyond salvage.

The cook's serenity didn't pervade the entire camp, however. There was a lot of wild shooting, a lot of running. Some 15 minutes after the Japs had broken into the area, a lone Negro soldier, barefooted and clad in a pair of blue shorts, came running into the camp of 5th Air Force Bomber Command half a mile down the road.

"Japs," he shouted at the top of his lungs. "Them Japs is comin', they done broke through an' killin' like mad!"

As the shooting had already been heard at BOMCOM, the soldier was taken to an intelligence officer whose first task was to calm him to coherency. The first fact brought out was that the construction outfit had been attacked by a "lot" of Japs (it was later determined that about 150 Japs had infiltrated during the night). The Americans had returned the fire but soon had run out of ammunition. The soldier, whose name was Willis, had been sent back to get more ammunition, infantry, tanks and planes "cause the whole Jap army done broke through."

The officer gave orders to issue ammunition and strengthen the perimeter guard. He also notified higher headquarters, already clamoring to know what all the shooting was about.

Meanwhile, back at the scene of the breakthrough, another aviation service outfit had gone into action.

As a routine precaution, the 1804th Ordnance Battalion, Aviation, located 600 yards from the entrance to Buri strip, had six guards stationed at three vantage points along its defense line. At 0625 the monotony of their vigil was broken by wild shouting in Japanese and the fire of small arms from about 100 yards to the north, and coming closer. One of the guards ran to notify the commanding officer while the others concealed themselves and awaited developments.

The CO, Capt. Robert W. Marriott, of Philadelphia, Pa., issued terse and simple orders. In a matter of minutes the entire personnel of the outfit had been formed into a defense line. Most of them were dressed only in shorts, some had one sock on, others were barefooted. The only uniform items were tin helmets and carbines.

Within less than half an hour elements of a tank battalion bivouacked on the outskirts of Burauen had responded to a call for help. Together with two medium tanks and some 30 men, the 1804th fought a holding action against a fierce onslaught of Japs who had by then penetrated the area, bringing up automatic weapons and throwing hand grenades. At the same time they covered retreat of a signal company that was unable to defend itself.

The first shock of surprise over, Lt. Donald Watkins, of Dayton, Ohio, led a group of his service troops in an advance westward, forcing the Japs to withdraw into a coconut grove, leaving several dead behind. At 1030 a liaison plane was overhead spotting the enemy for the tanks. When the pilot signalled that there were some Japs in a rice paddy, Lt. Joseph Schmid, of Queens, Long Island, New York, led a skirmish which routed the enemy, killing at least two. Enemy machine gun fire then pinned down the Americans for several hours until they were relieved by the arrival of infantry troops. Lieutenant Schmid and one enlisted man were wounded, two enlisted men were killed.

By the time reinforcements from an airborne division took over defense of the area at 0030, the 1804th had killed at least 25 Japs, an enviable record for a service battalion that had neither been trained nor equipped, nor led to expect actual combat with the enemy.

Toward afternoon the situation was well in hand. It was far from peaceful, however, with constant firing of small arms and automatic weapons. A startling change had come over Headquarters, 5th Air Force. Officers and enlisted men sat at their desks with helmets on, .45s strapped to their waists, or carbines leaning conveniently nearby. Everyone was a little sheepish, a little scared, a little thrilled. It was a unique situation for an air force headquarters to find itself suddenly several miles in advance of the infantry's front line perimeter in combat with the Japs. There was the irony, too, of an air force with a thousand planes and more at its command unable to do much of anything about it but sit and wait. At the time a couple of hundred P-38s, B-25s and B-24s would have seemed a fair trade for a couple of hundred infantrymen. It was highly unorthodox and compromising for the powerful Philippines Assault Air Force.

Mess time came that evening, and everyone relaxed somewhat. The firing had died down to a sporadic crack of

URAUEN

rifles and an occasional burst of machine gun fire. The events of the morning seemed far away and unreal. A group of officers sitting outside the officers' mess was not too concerned about the night that lay ahead. Guards had been doubled and tripled. The whole thing had been an abortive Banzai raid. Tomorrow everything would be normal again.

As they sat smoking and shooting the breeze a roar of engines came out of the southwest. Then came the planes, 13 twin-engine bombers.

"Those boys sure are flying a perfect formation," one of them observed casually.

"Probably back from an Ormoc mission," contributed another, "but I didn't know we had any twin-engine bombers out today. How about that, Mac?"

"Hell," replied Mac, jumping to his feet. "We haven't got any 2-engine bombers on Leyte . . . those must be Japs!"

"In a matter of minutes the outfit formed a defense line. Some were dressed only in shorts, some had but one sock on."

The ack-ack and the rush for foxholes started simultaneously. The sky became a backdrop of brilliant fireworks. The planes didn't waver, the formation remained intact. Directly overhead they droned, the red ball of the rising sun plainly visible, heading straight for the airstrip to the east. They went into their bomb run. Then came the explosions, and as heads raised cautiously above the foxholes, apprehensive eyes saw a heavy smoke screen ascending less than a mile away.

"Smoke bombs," said someone in a faraway voice.

"And more planes," shouted another.

This time the drone of motors came from the southeast. The planes that followed, flying at about 500 feet, at first looked like C-47s. But that didn't make sense.

"C-47s, hell!" shouted an officer who prided himself on recognition. "They're DC-2s."

"Jap transports . . . must be 20 of them . . . heading right for that smoke screen over there towards Buri!"

A few minutes later the telephone rang at Headquarters Squadron. The Commandant, a major, picked up the receiver, recognized the voice of an IO at BOMCOM.

"Spiders are dropping over Buri strip," said the voice.

"That does it," said the major. "Are you sure?"

"Sure I'm sure, Major. Saw three paratroopers come out of one of those Jap transports myself."

"That means probably 200 or 300 paratroopers."

"Don't I know it!"

"Puts you in sort of a bad spot up there on the hill."

"You're telling me, Major . . . and what the hell do we air force guys know about that kind of fighting?"

"That's what we'll find out. Well, do the best you can until we can get some infantry up. This mud is hell, you know, but maybe Daniels can get some of his tanks up there."

The Headquarters Commandant of the 5th Air Force hung up. Immediately the phone rang again. It was a general wanting to know what all the shooting was about this time and didn't those trigger happy so-and-sos know that the situation was well in hand.

"It's well in hand, all right, General," the Major informed him . . . "in the hands of a couple of hundred Jap paratroopers who have just been dropped less than a mile from the general's house."

Two weeks of almost steady tropical rains had converted the mile or so square area of the 5th Air Force Headquarters into a mud wallow. BOMCOM was on a hill overlooking the paratroop landing. A tight defense line was quickly stretched almost solid along the perimeter with colonel and GI alike trying to remember when he had last cleaned and oiled his firearm and silently swearing never to be so lax again. In the area between Buri and San Pablo strips, less than half a mile away, the Japs were shouting and yelling and it was unpleasant music to the grim, silent men waiting on the hill. It was dark now and there was nothing they could do but sit tight and wait.

The area into which the Japs had dropped consisted of flooded rice paddies, water buffalo wallows, grass covered swamps, beautiful for saké-inspired Banzai raids, bewildering to chairborne headquarters troops. To make it worse no one really knew how many Japs there were.

An incredible macabre scene was taking place on San Pablo strip. Jap paratroopers were running up and down the strip as if drunk or drugged. They were singing, shouting; three were playing musical instruments—a jew's-harp, a harmonica and a small horn, evidently some kind of identifying and rallying instruments. They shouted, "Hello . . . hello . . . where your machine guns . . ." . . . hacked at gas drums, splashed the gas over several liaison planes. They threw lighted matches in the gasoline, screamed madly as they flung themselves into an orgy of indiscriminate destruction. Two men isolated in the tower telephoned a blow by blow description. The Japs simply didn't make sense; they shot off flares promiscuously, shot holes in wash stands, burned a jeep, overturned a truck, burned several L-5s. But other aircraft nearby, large ammunition dumps, CP areas and other important installations were unmolested.

Up on the Dagami road the 1804th Ordnance had dug in for the night. The entire personnel of the unit had been formed into a defense battalion. A 24-hour watch had been set up. Three sides of a rice paddy were strung with steel wire. Every 15 feet booby traps were installed, hand grenades with the safety pins attached to the wire. More than one Jap kicked the wire, set off a grenade alarm and was welcomed with a well-placed bullet. One Jap who got through the defense line was killed by a private firing through the mess hall screen, but not before he had thrown a hand grenade in front of the supply tent command post, seriously wounding several enlisted men.

The commanding officer of the 1804th had issued strict orders that there was to be no promiscuous firing, "If you see movement beyond the perimeter out there, hold your fire until you're sure it's a Jap and not a carabao."

Mindful of the order, some of the 1804th's enlisted men on guard duty at night hesitated when they heard splashing sounds in front of them, followed by a muffled cough. As there was no natural history book handy to tell them whether water buffalo coughed, they played safe, hurled five hand grenades and let go their Thompson sub-machine gun. There was no more noise as they sat through the rest of the night. When the first light of day revealed several dead Japs sprawled some 15 feet away, they drew a sigh of relief.

"Jeez," said one, "if they had been carabao the major sure would have burned our tails."

During the next three days the 5th Air Force Headquarters strained to carry on in a nonchalant "business as usual" manner, an attitude difficult to maintain with ma-

hine gun and rifle bullets whizzing through the offices ith disconcerting regularity. Rangers and other infantry nits of the Sixth Army had sloughed their way through the ud, and were greeted by the 5th Air Force with unretrained affection. An infantry company was invited and ven urged to put up its command post tent right in the fficers' living area. As an added attraction it was placed ithin smelling distance of the mess hall. The best to be ad was on the house for the doughboys. And for the oughboys, after four weeks of sleeping in mud holes every ight, lucky to get one K ration a day, eating three meals a ay out of plates with knives and forks, sleeping on cots, oing to movies, it was paradise, a rest camp. It was one for ll, all for one and everybody against the Japs.

The tank battalion under command of Maj. Leonard P. Daniels, was located in an area adjoining the headquarters uilding. It was a beautiful and comforting sight to see a eries of Sherman tanks spaced some hundred feet apart, a nachine gun nest in the middle of each interval. Stocky Major Daniels was proud of his outfit, informing everyone that his boys had shot down three Jap fighters in the early stages of the Burauen battle. What's more, he was sure his outfit could hold off an entire regiment of Japs should they attack his line, this last observation being of questionable comfort to the admiring headquarters men.

Gradually, men relaxed and by the night of December 10 they were beginning to joke about the incident. Then, of a sudden, at 1930, all hell broke loose again. Fifty caliber bullets tore through the tents of the tank battalions, through the plywood walls of Maj. Gen. Ennis C. Whitehead's house across the road. The Japs had no fifties . . . yet there was no doubt of these guns being 50 caliber after the tracers, one in four, were counted. The General ducked a bullet, ordered someone to find out who the blankety blank was responsible and that he'd blankety blank better stop it or think up a blankety blank good reason. The 5th Air Force had gone without sleepless nights long enough!

A staff officer traced the firing to the 8th Signal Battalion, Aviation, got Lt. Col. Paul V. Kaessner on the telephone. "Colonel," he said sternly, "you've got to stop that promiscuous firing down there immediately."

"Like to, sir," answered the colonel, "but the Japs . . ."

"Japs," shouted the staff officer, "Can't be Japs. That fire is coming from our fifties."

"That's right . . . and the Japs are doing the shooting."

"Where in hell did the Jap's get our machine guns?"

"How in hell should I know, sir?"

"The bullets are coming right through the general's quarters."

"Tell the general to get down on the floor. Incidentally, that yelling you hear is a Banzai raid on our mess hall."

The Japs broke into the signal area, shouting, "Signals, surrender, no?" They fired mortars, rifles, machine guns, threw hand grenades. They set fire to tents, rifled personal luggage, attached booby traps to vehicles. Colonel Kaessner's men fell back until they reached the hospital which was already crowded with wounded. There they reorganized and held. They did more than hold; they counterattacked, forced the Japs to retreat. By 0300, there wasn't a live Jap left in the area. They counted 30 dead Japs. The signals lost two dead, two wounded.

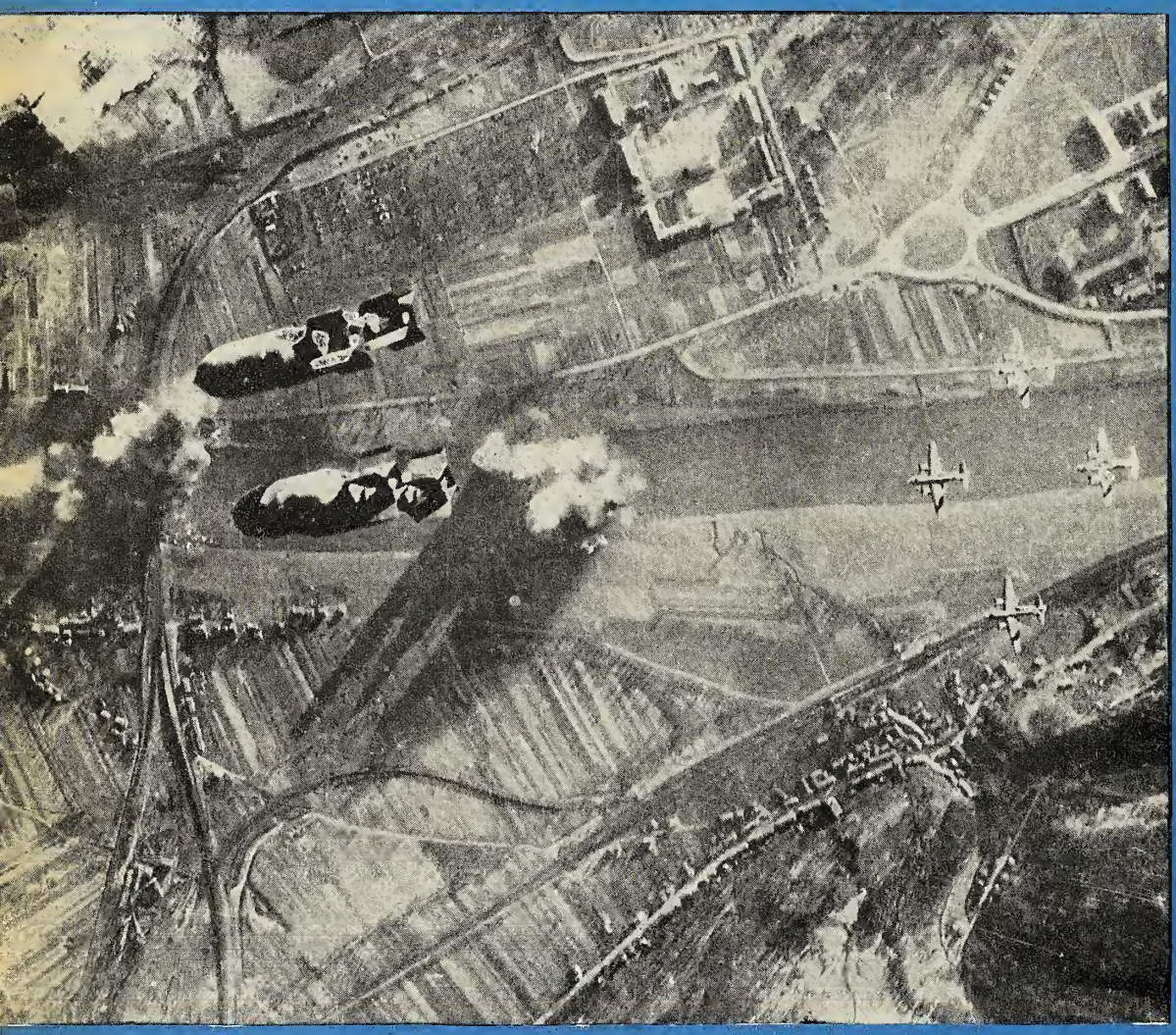
Meanwhile, Burauen and headquarters had once again been thrown into an uproar. Major Daniels "ordered" General Whitehead to the tank battalion command post

(Continued on Page 46)

General Whitehead snapped orders ike a tank commander — busy with a ew kind of war for an air general."

phase 1

Whittling-down the enemy air strength. This ME-109, shot down over Normandy, symbolizes the highly successful pre-D-day destruction of the Luftwaffe.



phase 2

Isolating the battlefield. This was the long-continuing phase that began before D-day, reached new peak of effectiveness against General von Rundstedt. This photo shows B-26s bombing Moselle bridge, key supply route.

phase 3

Direct cooperation with ground forces: P-47 radios to U. S. tanks a report on Nazi tank columns it has strafed.

How the AAF, in tactical air operations, applies a principle as old as warfare

Isolating the Battlefield

BY BRIG. GEN. FREDERIC H. SMITH, JR., AAF

Jeb Stuart used to say that his cavalry got ahead of the enemy by getting behind him. His favorite tactics were surprise and sharp attack where the consequences to the enemy would be most damaging and most lasting—at the crossroads of reinforcement and supply.

To this economical and highly selective kind of warfare, the modern airplane has added tremendous speed and striking power. Perhaps most important of all, the airplane has made it possible to change the hit-and-run cavalry raid, often a matter of lucky encounters, into a sustained operation directed day after day at definite and profitable targets.

Tactical airpower has recently been employed with tremendous effect in the Belgian Bulge, where General von Rundstedt's forces have been subjected to punishing attack. This was the second of two closely connected demonstrations of tactical airpower in Western Europe, the first having been the operations in Normandy.

The conditions under which we put the theory in practice in these two instances were dissimilar; in one case we were on the offensive and in the other we were on the defensive. Taken together, they present a very complete picture of the tactics and technique of tactical air operations in the isolation of the battlefield. This phase of tactical airpower is made possible by Phase 1—the whittling-down of enemy air strength until our own airpower is assured of definite and marked superiority wherever we choose to concentrate it. It may be preceded, accompanied, or followed by Phase 3—direct cooperation with our ground forces in the role of emergency or supplementary artillery. Both of these phases have been widely treated and are generally well understood; therefore this article is concerned principally with Phase 2, isolation of the battlefield.

Before the invasion of France began, our Phase 1 had been attained. The German Air Force could not possibly meet us on anything remotely approaching equal terms. It was certain that even if the Germans sent over everything they had on D-day, there was no possibility of seizing control of the air. Perhaps because the Germans were resigned to this fact, the GAF did not make an all-out effort.

Meanwhile, even before D-day, we had gone to work on Phase 2, isolating the prospective battlefield. This had to be done with discretion. We knocked down the Seine bridges because that operation could not indicate to the Germans where we were going ashore. We left the Loire bridges because their destruction would have been a complete giveaway. We took care of them on D-day and the days immediately following. For supply by rail, the German forces facing the Normandy landing were quickly reduced to dependence on the lines that ran between Paris and Orleans.

While blocking off the whole area at these important river crossings, our tactical air forces were also busy scouring the country behind the German 7th Army. In overwhelming air strength they attacked everything visible in the way of moving materiel, armor, trains, supplies and personnel trying to get up to reinforce Rommel. In effect, the Germans found a Jeb Stuart sitting on every crossroad for a hundred miles behind them.

The summer days of northern Europe are very long and the Germans had only three or four hours of darkness in which to move.

Gradually von Kluge's whole army was shut off from effective reinforcement. Attrition of the remaining motor vehicles on which he relied for mobility assisted the breakthrough at St. Lo and spelled disaster for the Germans. The certainty of that disaster had been apparent all along. No challenge to Allied power had been made by the GAF. With few interruptions, the build-up of troops and materiel went on across the beaches.

Lacking reinforcements, food, gasoline, and armor, the enemy faced an Allied force of steadily increasing power. The Germans had to break.

The effectiveness of this isolation of the battlefield—which the Germans had demonstrated under quite different conditions in 1940—was a bitter lesson for enemy forces. After the first two weeks, for example, some members of a "Panzer Lehr" outfit were captured. That division had come from a concentration area near Chartres. At the time of the landing, they were about 100 miles away—and it had taken them eight days to get their elements into the battle. Had it not been for our tactical air units, they would have been fighting on D-plus-1. Parachute divisions in nearby Brittany were delayed for two weeks; and even then they dribbled in on bicycles and on foot. Ninety-nine percent of their motor transport had been put out of action.

Quite apart from such dramatic facts as that Field Marshal Rommel lost his life to the "Jeb Stuart" air forces, these tactical operations in Normandy will remain a subject of close study. They preceded and accompanied our breakout from the peninsula and subsequent overrunning of France. As General Eisenhower has cordially said, they were vitally helpful in both achievements. During more recent operations in France and Belgium, tactical airpower has been revealed in another and equally effective role.

In Normandy the tactical job was to force a line, and once through that line to keep the retreating enemy so off-balance that he could at no point collect the strength to turn and confront our pursuing ground forces. The Germans were, in fact, unable to turn until we had been more

(Continued on Page 36)

After Burma, Normandy, southern France, Holland, our glider jockeys are riding high—so much so that entrance requirements are more exacting than ever

the G stand

This particular CG-4A landed near La Motte during our invasion of southern France. Although the wing got chewed up, all hands landed safely

for GUTS

BY MAJ. LUTHER DAVIS
AIR FORCE Staff

After a couple of years of being a trifle pushed around and heckled by the power plane boys, our glider pilots now have a great combat record of their own—and are beginning to feel their oats. With the successful glider shows of Burma, Normandy, southern France, Holland behind them, many who have both power and glider ratings say—as did one first lieutenant—"I'd rather wear my glider wings than my power pilot's wings any time. They mean that when the next big show starts I'll be in it—not just over it."

Among their most enthusiastic fans are the airborne infantrymen they've carried and with whom they've fought on the ground. For instance, there's one airborne captain who likes to tell people about the time in Normandy when his outfit was pinned down by German mortar fire. "We couldn't get our heads up long enough to even see where it was coming from," he said. Then they heard the rattle of small arms and next thing they knew there was no more mortar fire. Three glider pilots and a wounded paratrooper had approached the Jerries from the rear and captured the lot of them—40 some odd—with a few carbines and a grenade. "They could have just bypassed the whole affair," the infantryman said. "They'd already done plenty. We owe a lot to them and so do others I know."

A year ago our glider pilots were unknown quantities—about a dozen had taken part in the Sicilian invasion where most of the gliders were flown by British crews. Except for that they had almost no combat record until March, 1944, when they began with a bang—spearheading the invasion of Burma. Since then there's been Normandy, where 20.1% of the total material delivered to the beachhead by air was in gliders; southern France where 41.2% of Troop Carrier's deliveries were landed in CG-4As and Holland, the airborne end of which was 42% a glider show.

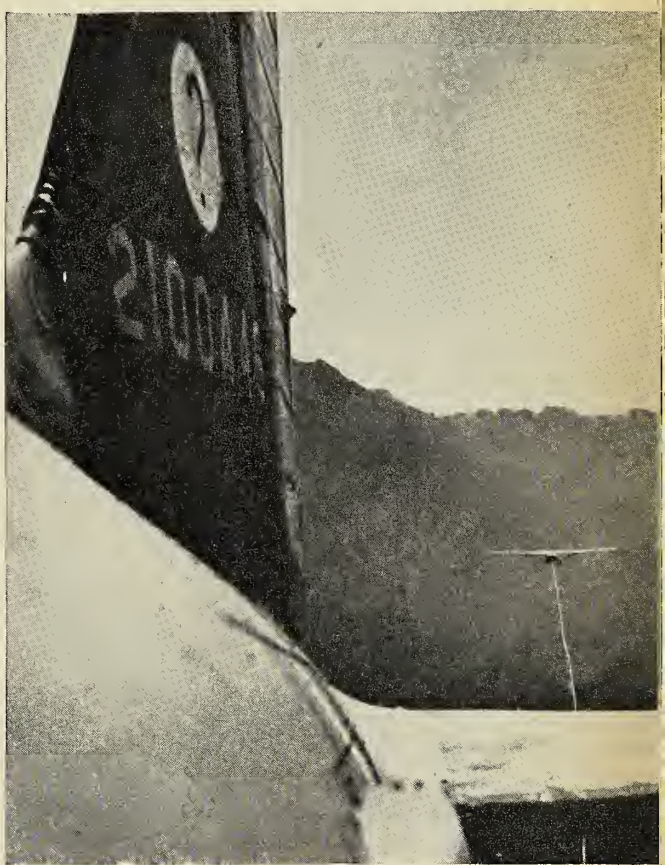
They've turned in combat records in the air and on the ground that make some great adventure stories. Take the official report of a flight officer who landed on the Cherbourg Peninsula on D-day: "Flak and machine gun fire were coming up heavy as we glided in and I noticed quite a few holes in the tail after getting on the ground. We started to get it from the coast in and ground fire came from all around our Landing Zone.

"We released and I made a 270° turn, but, as we approached, another glider came in right underneath us and we hit a hedgerow, knocking off our landing gear. The center of the glider buckled, pinning the jeep in, but we had no casualties.

"I took out a patrol to locate our assembly area; shells were coming from the right and there was machine pistol firing from that direction too. The Germans came toward the corner of the hedgerow where I was so I took out a grenade and threw it into the midst of them. I saw five of them fall. Then I opened up with my M-1 and got four more for sure. They threw a grenade on the edge of the bank against which I was lying and the concussion of it knocked me out. I was only semi-conscious when I opened my eyes to find a German officer standing over me with a machine pistol. He hollered 'American officer' and they took me back to a German regimental headquarters.

"While I was there a Frenchman sneaked me wine,

During our operations in Holland, this glider landed in a turnip patch. Dutch civilians helped unload the glider.



Starting our Burma invasion, a CG-4A climbs over the Chin Hills. They had to top an 8,000-ft. range of mountains.

Below: A re-supply man's view of the landing zone in Holland on September 18, 1944. The troops are elsewhere—and busy.

champagne and cognac. After a while I got a pretty good buzz on and when the German colonel came to talk to the guard in the doorway I broke out one grenade which the Germans hadn't found on me. I rolled it between the colonel and the guard, stepped behind the cement wall and waited. It killed them both all right; I took the colonel's folding carbine, map and field glasses and went out through the back door. Found a horse and rode it to behind our lines."

This is the kind of action that provided the background for a document of which the glider boys can all be proud. It's a letter written by the Commanding General of the 82nd Airborne Division from the Cherbourg Peninsula on the eighth of June—two days after D-day. At that hot moment in the history of the world, Maj. General Ridgway found time to write: "Under most difficult conditions, including landing under fire in enemy-occupied terrain, these glider pilots did a splendid job. On the ground they rendered most willing and effective service, providing local protection for the Divisional Command Post during the most critical period when the Division was under heavy attack from three sides."

A Troop Carrier team takes off from England loaded for our airborne invasion of Holland.

Rugged as their job is, glider piloting has not turned out to be the suicide mission many pessimists prophesied. The official loss rate among gliders for the toughest of our large airborne shows so far—Holland—is 7.8%, while in southern France glider losses were 2.3%. The combined glider loss for Normandy, southern France and Holland was 4.6%—which compares favorably with other kinds of combat flying.

The lack of fire hazard in a glider—no engine; no gasoline—helps account for this comparatively low casualty rate, but even more important is the flying skill of the glider pilots themselves. By using their heads at critical moments and by exercising split second judgment they have proved to be their own best friends: "The glider ahead of us made a 270° turn and proceeded to let down into a field directly in the line and umbrella of fire being sent up by enemy troops located around the edge of the field we were briefed for. Observing this fire, I made a 180° turn and landed in a soft green field nearby. Fortunately, the other boys followed me."

When you have no throttle to push forward—no way of making a second pass—a decision like that takes skill to execute. As the glider pilots have performed under fire, respect for the high caliber of technical skill required of them has grown apace. These boys have to know how to fly and from now on, by decision of the Commanding General, all officers chosen for the glider program must have checked out in twin-engined aircraft. This is the culmination of a steady increase in entrance requirements for glider training which started at 35 light plane hours, were later upped to 125—now require the twin-engine rating.

Because the glider is in—has proved itself—and because there are big plans for its employment, we need more glider pilots and need them badly. They will all be drawn directly from the Training Command which now permits newly graduated cadets who have checked-out in twin-engine planes to volunteer for gliders. Single-engine pilots who volunteer will be checked out in twin-engine aircraft before being assigned to 1 TCC.

The students go directly to I Troop Carrier Command's Laurinburg-Maxton Army Air Base in North Carolina where they're given an intensive ten weeks course. This starts with physical training, moves into infantry tactics and use of infantry weapons—M-1, machine gun, sub-machine gun, bazooka—and finally leads into glider flying proper. The students keep their flying pay during the ground phase of their training by getting time in L-4s and L-5s provided for that purpose.

When they come out of Maxton they know how to land the CG-4A under varied and difficult conditions; they know how to fly it, and they know how to fight like commandos when they hit ground. They know judo and a few tricks with knives—they're physically tough and mentally aggressive.

Almost immediately after graduation the new glider pilots are shipped—at present a 30-day lapse between graduation and shipment to a combat theater is considered abnormally long. This fact is causing many new twin-engine pilots to go into gliders rather than settle down for the long routine of transition schools, OTUs and delays in assignment which they expect as power pilots. As one eager young flight officer put it, "My brother was killed last year and I've got a job to do. I figure as a glider pilot I'll get to fight quicker—and harder."

Many of the new arrivals at Maxton are there because they believe that glider flying will improve their skill as pilots of anything, powered or not. This is borne out by the testimony of such famous power-glider pilots as Lt. Col. M. C. ("Mike") Murphy who was a stunt flyer before the war. He believes that motorless flight enormously improves a pilot's judgment of speed and distance; gives him a feel for his aircraft that plain power pilots sometimes lack. In Colonel Murphy's camp are other well known power-glider pilots such as Lt. Col. Arvid Olsen, Col. John E. Allison, both China fighter aces—and even Charles A. Lindbergh.

A rather anxious student at Maxton said he had volunteered because he believed that after the war power pilots would be "a dime a dozen." He thought that if in addition to being a qualified power pilot he had glider wings, he'd be surer of employment and be able to "get in on the ground floor" of a new industry. Glider enthusiasts talk about freight feeder lines depending on gliders for intermediate deliveries, and see great commercial possibilities for this war-developed method of flight.

These are American glider pilots being briefed for a hazardous landing in enemy-held Burma, in March 1944.

Those who volunteer for gliders have great opportunity for rank and ribbon. The T/O permits glider pilot flight leaders to be first lieutenants; glider officers in Troop Carrier squadrons, captains; in groups, majors, and in wings, lieutenant colonels. They rate both power and glider wings; usually get the Air Medal for each combat mission—and glider pilots today are sporting a lot of DFCs, Silver Stars, and Bronze Stars. Of all combat flying personnel only glider pilots rate the bronze arrowhead device to be

(*Continued on Page* ***58***)

Tac R

If you need some bomb-damage assessed in a hurry, or artillery fire adjusted, or lost battalions found, call on these tactical reconnaissance boys

BY S/SGT. MARK MURPHY

AIR FORCE Overseas Staff

When the going was rough in the Ardennes some weeks ago, Capt. E. B. Travis, who is a small slim fellow called "Blackie," was handed a job: two regiments of the 106th Infantry Division were cut off; it was necessary to find out where they were.

Blackie, a member of the 10th Reconnaissance Group, took his P-51 up into a two hundred-foot ceiling and flew the Ardennes, a mist-choked region of trees, mountains and ravines. Sometimes the Mustang whipped through a tunnel formed of ground mist below, cloud above, and snow-bent pines on either side. The plane veered through ravines, followed and skirted the contours of the hills and rocks. Travis made four such flights. No other planes were in the air and Travis went without a wingman because it was judged that the mission was so dangerous that only one aircraft and one man should be risked on it.

The last flight was made toward dusk in a ceiling varying from fifty to two hundred feet—visibility one hundred and fifty yards—and Blackie had to get down low enough to see the ground and recognize things on it; a simple matter of buzzing mountain valleys in a fog, it called for fantastically courageous flying. The two regiments were found.

This work is typical of the pilots in the tactical reconnaissance squadrons of all the TACs, the IX, the XIX and the XXIX. Their job is finding out what has happened, what is happening and what is likely to happen. They whip in and look over a bridge just after the bombers have made a run on it; they seek out enemy troop concentrations and movements; they adjust heavy artillery fire; or stooge around over enemy territory and lead Thunderbolt squadrons to targets they have found.

Capt. Edward L. Bishop landed one recent Sunday after spending what is considered in Tac R circles a good few hours. He was over a small town in Germany adjusting artillery fire, when he saw some tanks moving into the town a little out of range of effective heavy gun fire. He called for some P-47s, and when a squadron showed up some minutes later he led them to the tanks.

The squadron went down toward the tanks, but flak from the town drove them from the bombing run. Bishop got in touch with the artillery fire direction post and gave it the positions of the flak batteries. The artillery let go, and the Germans at the AA guns ran for their foxholes. While they were in them the Thunderbolts nosed down and bombed the tanks. Bishop and the P-47 leader gave the enemy time enough to get back to their gun positions and called for artillery again. The shells hit the flak positions; the gunners ran, and the 47s came down and beat up the tanks with armor piercing incendiaries. The tanks were stopped, the Thunderbolts went home. Bishop got the artillery pin-pointed and then flew on to his other work, which was finding out what the enemy was doing in a certain section in Germany.

Although Tac R fellows see little glamor in their jobs, they are the objects of considerable admiration from other pilots, ground controllers and members of the ground forces. "We think they're wonderful," one rather unrestrained infantry G2 said. They fly in pairs in almost any kind of weather, frequently indulging in an odd maneuver called "jinking." This is visual reconnaissance performed while the number one man weaves along up on one wing and then the other, while the number two man trails him in slightly more level flight. Number one watches the ground continually while the wingman protects the flight by watching the sky. Tac R pilots are superb recognition experts. They know German, American, British and French armor, planes, motor and horsedrawn vehicles—a little better, probably, than the men who write the manuals—and they can recognize any of it while doing a buzz job at 350 mph.

They are not supposed to fight enemy planes, their job being a tactical one of high importance, but as one fellow (an ace) said, "You just can't go and leave an ME109 stooging around. He's likely to get on your neck. So we use active defense." The 10th Group which does day and night photo reconnaissance as well as Tac R got 40 planes last year. Purely in defense, of course.

The pilots are forbidden to do any strafing, but there have been cases. "You train a pilot to be a fighting son of a gun.

(*Continued on Page 58*)

THE AAF LOOKS AHEAD

BY GENERAL OF THE ARMY H. H. ARNOLD

Commanding General, Army Air Forces

In his second wartime report to the Secretary of War, just published, the Commanding General evaluates some important lessons learned by the AAF in three years of war. Explaining that it is impossible to cover all of these lessons in detail and that new ones are being learned every day, General Arnold sets forth certain basic principles regarding airpower and the long-time security of the nation. These principles are stated in 12 major points, as follows:

✗ Airpower is the weapon by which the aggressor in this war first struck and with which future aggressors will strike. The range, speed and destructive capacity of a powerful air force is such that, given sufficient air superiority, the aggressor can by sudden action disrupt the life of the attacked nation and make difficult the taking of defense measures. Moreover, in this field which the present war has shown to be subject to revolutionary advances, we can only dimly visualize the possibilities of such sudden action in the future.

✗ We must recognize that the only certain protection against such aggression is the ability to meet and overcome it before the aggressor can strike the first blow. In the past, such blows were waterborne; traditional naval power was our first line of defense. From now on successful aggression must come by air. The defense lies in adequate airpower with all its manifestations, and our first line of defense must be in the air.

✗ The foregoing principles can mean only one thing to the United States. In two world wars, the aggressor has moved first against other peace-loving nations, hoping that the United States would remain aloof, or that other nations could be defeated before this country's power on land, sea and air could be brought to bear against him. Luckily, in each war there has been time for the mobilization of such power, and the United States has been the determining factor in the defense of civilization. The lesson is too plain for the next aggressor to miss: The United States will be his first target. There will be no opportunity for our gradual mobilization—no chance to rely on the efforts of others. It is of the utmost importance that our first line of defense, in the air, must be ably manned and fully supplied with modern equipment. We must be able to provide time for other parts of the national defense machine to mobilize and go into high gear. The United States must be the world's first power in military aviation.

✗ Airpower and air supremacy are terms which require careful definition. Their full significance must be understood by the American people. The nation must also understand that, due to the revolutionary developments of science and the world's inventive genius, they may have entirely different meanings for successive generations or within any short span of years. In 1918 airpower was built around the Spad, the Handley Page, the Gotha, and the Caproni. In 1944 Allied airpower was built around the Spitfire, the P-51, the P-47, the Hurricane, the P-38, the C-47, the B-17, the Lancaster, the B-24, the B-29 and others. In 1945 or 1946 it may mean other as yet undisclosed types. In 1952 it may mean far different equipment with destructive power and accuracy of which man has not yet dreamed.

✗ Thus, the first essential of the airpower necessary for our national security is preeminence in research. The imagination and inventive genius of our people—in industry, in the universities, in the armed services, and throughout the nation—must have free play, incentive and every encouragement. American air superiority in this war has resulted in large measure from the mobilization and constant application of our scientific resources.

Comprehensive research, both within and without the air services must be expressed in inclusive and continuing programs. Only in this way can our air forces reflect at all times the rapid advances in aerodynamics, physics, chemis-

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THIS IS YOUR ENEMY

. . . it's your life or his

Geschwindigkeit Is Right. A good many American airmen have recently met their first German jet planes in combat. For some time reconnaissance pilots have been reporting the ME262, a more recent acquaintance than the ME163. Fighter pilots and bomber crews have now had their say about the ME262. In a wink it has sometimes been mistaken for a P-38 or a P-51 but recognition is usually instan-

Lightning vs. ME262

aneous. As for speed, it blazes along all right—well over 500.

The ME262 standard trick is the classic attack out of the sun. Its typical dive is shallow, its standard turn wide. Against bomber formations it slants through at tremendous speed adopting hit and run taeties. It has recently taken on fighter escort. Besides its employment as a fighter it has carried out the same kind of low level attack as the ME163 and is being used to bomb targets of immediate tactical importance.

The Germans have not left all the talking about this plane to allied pilots. Sometime ago Berlin newspapers celebrated it under the name "Blitzbomber." Recently a widely distributed German pamphlet carried this description BLITZBOMBER hohe Geschwindigkeit dabei starkes Rauschen mit Pfeifton" (high speed accompanied by a loud whistling sound). American pilots don't bother about the whistle but they add "Geschwindigkeit, brother, is right."

Puzzle Solved. Not long ago the 13th Air Force was considerably annoyed by Japanese planes that came in low at night and dropped bombs on airstrips before the Americans had a chance to detect them. Location of the Jap home base was a puzzle. One day the crew of a B-24 out of formation south of Morotai noticed the coconut palms walking like men. It turned out that the Japs had a field in the Halmaheras, hidden by palms on sleds. At night the palms would be dragged away, and there was an airstrip. Repeat, there was an airstrip.

More Smoke. To diffieulties which Germany has been able to put in the way of the AAF, add more effeetive smoke screens. Here's the confirmed score for each January since the war began: 1942, 2; 1943, 10; 1944, 38; 1945, 74. Screens are usually produced by generators consisting of metal drums of 40 gallons of "chlorofonsaure." Effective density is achieved in about 20 minutes. If possible the Germans start the smoke about half an hour before an attack. Crews manning the equipment are often non-Germans; whole smoke companies have been imported from Italy. Screens can be expected on clear nights. Fake screens in wasteland and multiple screens near an important target are sometimes used as decoys. Germany has lately relied more on quantity of smoke than on tricks, however.

The Japanese have also increased their tactical use of smoke. One bomber crew over Manchuria reported that target areas were quickly obscured. The smoke did not prevent effective bombing, but it hampered visual observation. For this kind of difficulty, there is the compensation that efficiency of antiaircraft fire usually decreases in the presence of a smoke screen.

As Matsuzaki Sees Us. Domei's correspondent, Matsuzaki, covering front-line bases in Luzon has informed his Oriental readers that the United States has begun to use pilots "about 45 years old." The sight of them, he says, causes Japanese to exelaim in astonishment, "What old soldiers!" Members of the Imperial Army were also astonished, Matsuzaki adds, by the discovery that B-24s were carrying women members of the crew. He concludes, without exclamation,

"Judging from the way women are used in England as members of the air defense corps and as tank crew members, and from the way pilots 45 years old and even women crew members have been sent by the United States to the decisive battlefields of the Philippines, we conclude the enemy's serious manpower shortage."

One FW Is Missing. The most embarrassed flyer in the GAF is the pilot of a "long-nosed" FW 190. During one of the Luftwaffe's recent attacks in force, this pilot made a steep dive on a light AA position. The gunners put everything up the barrel. As the German came out of the dive, his engine cut out. The FW was dead. With great skill the pilot made a belly landing. He was surrounded and captured, his plane taken as a first-rate military windfall. But as the triple-A battery was about to chalk up one more victory, technical intelligence concluded that credit really belonged to a partridge, nationality unknown, which had hit the coolant radiator, making a hole several inches in diameter.

Wooden Bullets. Talk about German wooden bullets simmered down considerably after United States experts reported for the Air Technical Service Command. The wooden bullets made their appearance on D-day, and large batches were left behind by retreating Nazis. Tested, these gadgets proved less dangerous than peashooters. At two feet, they will pierce an ordinary piece of paper. At five feet, they hit the paper and plop to the ground. Their maximum range is 15 feet. Muzzle velocity is droopy. Speculation about the use of these bullets because of "lack of metal" has given way to the calmer opinion that the missiles were merely leftovers from field maneuvers in Normandy at the time of the invasion.

Jap Dummy Planes. As early as the autumn of 1942, bomber crews reported that the Japanese were using dummy aircraft to mislead our attacking planes. The dummies were not seen in any great number, however, until Japan began to withdraw up the Pacific. Then, on numerous islands, crude makeshifts or painted outlines were found. More recently, dummies have been sighted or captured in larger numbers. Their quality is excellent. They are made with care; propellers have been added and canopies finished so as to deceive low-flying planes. Generally, the dummies are raised in front to imitate the appearance of operational aircraft. Sometimes they are lined up in normal patterns to attract attackers away from profitable targets. Occasionally they are bunched near concealed antiaircraft positions as decoys for the Japanese AA gunners.

German "Work" Planes. German transport planes have come back into the recognition picture. AAF units moving up close to the Reich and those in German air are seeing more and more of the "workers." The tri-motored JU52, old reliable of the Luftwaffe, is still around. The ME323, first cousin of the glider ME321, pounds along on six engines. Of the newer transports, the Arado AR232, high-winged, high-tailed, thin-boomed, appears in twin and four-engine versions. ME109s and FW190s, and the other German combat craft have rated more talk during the war, but the German Air Ministry sounded serious not long ago when it delivered special commendations for "Pilots and planes that get troops and fighting equipment to and from the front."

Jap Armament. A powered gun turret and powered gun mount developed by the Japanese have been reported from the Pacific. The turret generally carries a 20 mm cannon, but it may also be fitted with the 12.7 and 13 mm machine gun. The gun mount carries either 7.7 or 7.9 machine guns. Both turret and gun are operated hydraulically. The single-hand lever turret control usually requires the operator to be at or near the installation, although in some planes—the Irving, for example—the mount is remotely controlled.

The Road Back. The Japanese philosophy by which the individual is canceled out for the sake of the state has been illustrated often enough in combat. No official Japanese statement has given more solemn expression of this attitude toward war than a training directive which includes instructions to soldiers taken prisoner:

For unwounded personnel, the only alternatives are death or escape. Before dying, the Nipponese fighter is expected to strike a blow against the enemy. He is warned especially that kind treatment by captors and anti-war doctrines are subversive to his honor.

For the prisoner who escapes, the future is grim. He is directed to collect as much information about the enemy as possible and report to his superior officers. After return to his ranks, the ex-PW must "realize his misdeed, show penitence, make a full statement, and await the decision of his superiors." He still has a chance to "wipe out the humiliation and cleanse his disgrace by death in combat" if he is an enlisted man; if he is an officer, the recommended course is suicide.

The directive leaves no room for compromise: "Although there are sympathetic feelings against persons who have fallen into enemy hands due to severe wounds, no matter what the excuse may be, it is the utmost disgrace to be captured alive."

Conversation. Lieutenant General Tatekawa, director of one of the Japanese youth groups, has issued instructions on "loyal conversation." If a true loyalist hears somebody say, "Japanese Fleet does not show up. Where is it?" and somebody else reply, "My guess is that it has been defeated," the loyalist's comment should be, "Fleet? Fleet is still intact. It watches gloatingly for opportunities to strike."

If that bit of repartee isn't successful, the loyal conversationalist is to add, "Besides, warships are not the deciding factor in present naval warfare."

To complaints that "aircraft production may be great, but half the planes are useless," the loyal answer must be, "Government admits a few planes are useless; but half of them—that's absurd." The suggested tag-line here makes some sense: "If we can manufacture enough planes, we can win."

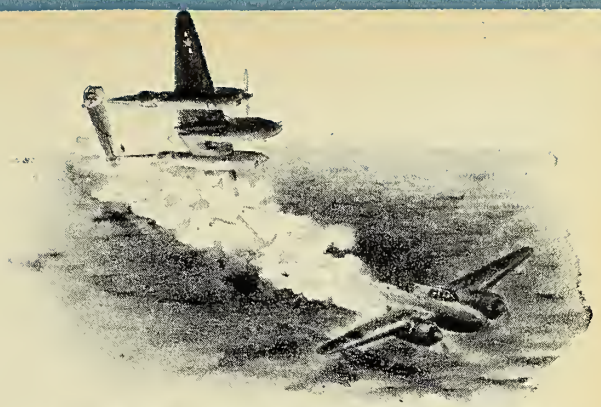
Tatekawa's conclusion to all this loyal repartee is that men can be trained to "grab any man with wrong ideas, hold him by the arm," and correct his thinking.

Then, as a mild cynic has suggested, if the thinking is too hard to correct, you can always twist the arm.

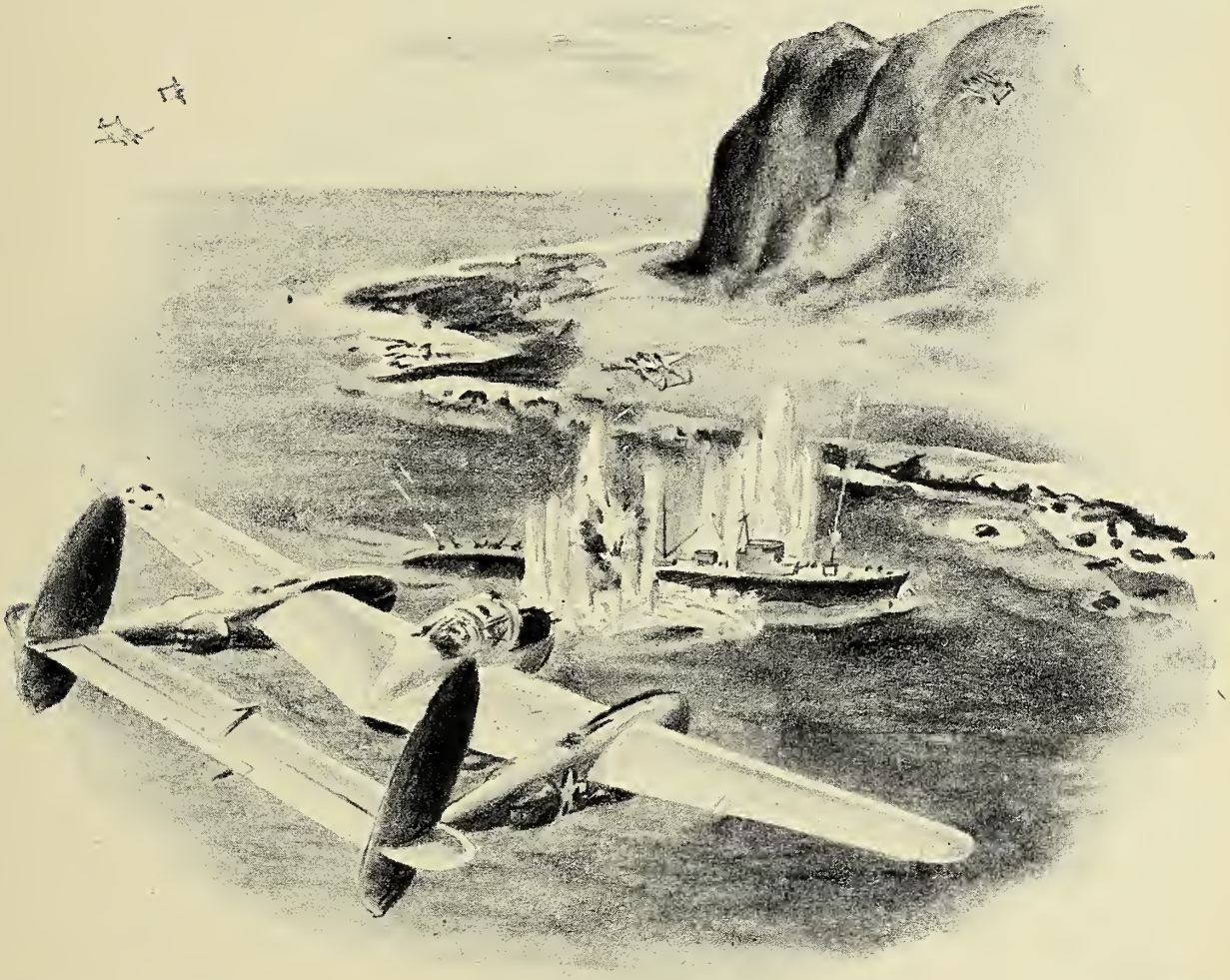
Ace of Aces. Hitler has created the fanciest of all decorations, and a flyer is the first to win it. The new symbol of valor, to be awarded to only one dozen men, is called the "Golden Oak-leaves with Swords and Diamonds to the Ritterkreuz." Hans Ulrich Udel, the Luftwaffe's "Ace of Aces," is the first recipient. Udel commands S.G. 2, which bears the name of the famous Immelmann. Flying on the Eastern Front, he is said to have put 16 Russian tanks out of action within a few days. ☆

Strike at Iwo Jima

P-38s strike at Iwo Jima—7th Air Force P-38s based on Saipan, 750 wet miles away. The accompanying sketches were made by AIR FORCE staff artist, Capt. Raymond Creekmore, who rode in a B-29 acting as navigation plane for the mission. Since last August, the 7th has raided Iwo Jima almost daily, dropping over 4,600 tons of bombs on the 12½ square miles of volcanic island, and the 21st Bomber Command has added more than 1,000 additional tons. The reason—Iwo Jima has two airfields and is midway between Guam and Tokyo. A very strategic island.



P-38 piloted by Maj. W. Roeser exploded a Nick's right auxiliary gasoline tank, and caused another explosion in the Nick's left wing root: One Nick, confirmed.



All the fighters made repeated passes at a Jap Naval Transport (APD) lying offshore. The vessel put up a lot of heavy automatic rifle fire which slightly damaged one P-38, but the fighters kept plugging at the superstructure, bridge, and waterline. When last seen the ship had been beached to prevent sinking and three fires were burning amidship. The rifle fire had stopped.

Three Zekes were found neatly parked, wingtip to wingtip. They were thoroughly strafed by 1st Lt. James Deyonker, and the plane in the middle exploded, probably setting fire to the other two Zekes. Everybody came down on the deck—including the B-29—and soon there were many fires in dispersal areas, bomb dumps, and unidentified buildings. All our planes returned to base.

SNOOPERS

By Air Force *Overseas Staff Correspondents*

ILLUSTRATED BY FIRST LT. NORMAN F. TODHUNTER

A crew of the B-24 "Snoopers" is being briefed. Weather and other factors pertinent to a long over-water flight are covered in detail. Then comes the payoff—target and mission for tonight.

"We believe," says the intelligence officer, "that the Japs must be staging their raids on our Leyte forces through airfields on Cebu Island. That is your target—every airfield you can find on Cebu. And your mission: to heckle the hell out of them all night long. That will be all, gentlemen."

With that laconic instruction, the Snooper crew is on its own. The real briefing takes place within the B-24 as it gains altitude over the Celebes Sea; the mission is planned, decisions made, tactics evolved by the crew itself. Pilot, navigator, bombardier, electronics operator, all make their contributions to the plan of operations that will be translated into action by the superhuman Snooper devices, equipment that enables their plane to navigate unerringly across a thousand miles of open sea and weather, through the blanket of night, to spot a blacked-out, invisible target with the sureness of a thoroughbred pointer.

The Snoopers of the 13th Air Force in the Southwest Pacific are individualists, whether their mission is sea search, shipping attack, or the blasting of enemy airfields. They are wolves of the night, hunting alone, as against the pack tactics of their daylight brothers who fly formation.

This type of operation was born as a project of Lt. Gen. George C. Kenney back in the days of the Bismarck Sea.

The Snoopers, one of these units now operating with the Far East Air Forces, did not attain the maturity of a per-

The "Snoopers" of the Far East Air Forces have a unique method of making life miserable for the Japs—after dark

manent status until early 1944. Since then, like bats out of hell, their nocturnal B-24s and those of a similar outfit with the 5th Air Force have haunted the Japs from New Ireland to the Netherland East Indies, from Palau to the Philippines, have tormented Truk, bedevilled Borneo, walloped Woleai, struck shipping from battleships to barges.

Like huge, purring cats in the night, they pounce upon their prey without warning. Their eyes are a low altitude bombsight that sees in the dark far better than human eyes have ever seen in the daytime, enabling the Snoopers to come in undetected by the enemy and strike at an altitude of 1,500 feet or less, an altitude that makes the daylight boys shudder.

Snooping is hard work. Missions of the 13th Air Force Snoopers (who claim the global copyright to the name) are 2,000 miles and more over open water, without fighter escort; duration of missions varies from 10 to 18 hours in the air, is limited only by their gas supply. With their special electronic detecting, navigating and bombing devices, heavy bomb loads and maximum gas load, B-24 Snoopers carry more than 10,000 pounds in excess of the plane's designed load capacity.

Maj. James D. Barlow, of Oakland, Calif., former B-25 pilot and commanding officer of the Snoopers, explains that the outfit has had to adapt itself and its technique to fit the tactical situation, sometimes almost overnight. They have switched from shipping to land targets and back to shipping. A similar method of locating the invisible targets is used for attacking both shipping and land targets. The latter, however, does not permit as great accuracy in bombing, is more often of the "keep the Jap awake and alerted" variety.

By choice, shipping attacks are the favorite Snooper vocation. There is a definite satisfaction, they say, in being out there in the night, all on your own, sighting the target from 30 or more miles away, figuring out for yourself the best method of approach and attack, the challenge of closing in undetected on the victim, making the kill unassisted.

Every mission presents a new and different problem to be solved. Their target is an unknown quantity and may vary from a Sugar Charlie to large transports, cruisers, destroyers or battleships; each one requires a different technique. The ship may be alone or in convoy, it may be capable of sudden evasive action, possess an unexpected potential of firepower. As each mission is performed by an individual plane, it calls for extraordinary initiative on the part of each crew, the closest cooperation. Within each Snooper crew must exist the essence of teamwork.

Considerable research and practice went into the development of the Snooper—which has been referred to by the Japs as "the plane with a thousand eyes." Credit for much of the pioneering must go to Col. Stuart O. Wright, who in 1942 rounded up some veterans from the old First Sea Search Attack group and formed the first Snooper squadron.

First they tried out the new equipment while hunting enemy subs. Then came months of additional testing at Eglin Field. Finally in the summer of 1943 they decided they were ready. In August of that year, the first squadron of Snoopers arrived in the Pacific and joined the 13th Bomber Command.

In those days the Japs were convinced they could hold the Solomons for a long time. We had fairly good control of the sky in daylight but at night Jap surface vessels could shift men and supplies from one island to another with little chance of detection.

But on the night of August 23, 1943, we gave the enemy one more indication that this war was going to be fought according to our time table and under our conditions.

Two Jap destroyers slipped out of their hidden harbors and moved into the slot that runs all the way up the Solomons between Santa Isabel and New Georgia. They were going to evacuate some troops from Kolombangara and Vella Lavella.

We knew they were coming. They had been doing this regularly for it had been almost impossible to intercept them due to treacherous waters and the darkness of night.

Confident that nothing could stop them, the men on those Jap destroyers probably didn't pay much attention to the drone of an airplane in the black skies above them. If they thought about it at all they probably figured that the Americans must be desperate to waste gasoline and airplanes in such darkness.

Suddenly several bombs rocketed down as if they were released along an invisible line connecting the plane with the ships. As they hit squarely on the destroyers they tore the night apart. The airplane made two bomb runs and each time scored direct hits.

This was the first Snooper mission and a highly successful one. But the Japs evidently thought that precision bombing after sundown was purely a matter of luck. They continued to send shipping down the slot at night.

This refusal to face realities proved costly for the Japs on the night of September 29, 1943. In Snooper annals, this date is known as "the night of the Tokyo Express." On that night 11 enemy ships steamed down the slot to evacuate their men from Kolombangara.

The Snoopers were expecting them. They had six planes up and every entrance and exit in the slot was covered.

There is little twilight in the tropics and the darkness closes in quickly. It was just a few minutes before the last faint rays of the setting sun had vanished from the western horizon that the Snoopers caught the Jap convoy in Bougainville Strait.

By the time the battle was joined, it was completely dark but the Snooper crews could see their hits. Five distinct

fires flared up from five of their targets. One ship blazed like a candle in a closet before capsizing.

In the early morning the action finally was broken off. The Jap formation turned—what was left of it—and retreated back to its base. The enemy had used every means available to break through the aerial blockade. Their anti-aircraft fire was heavy and one of the Snoopers went down. But the Snoopers again had proved themselves.

As time went on, the Snoopers expanded the radius of their patrols alert for anything that moved below.

Perhaps the largest single victory for a Snooper plane occurred when one of them spotted a Jap aircraft carrier attempting to ferry fighter plane reinforcements to one of the battlefronts. This Snooper caught the flat top just off Buka passage and scored three direct hits. The next day there was little fighter opposition when our bombers came over Kahili and Bonis airdromes. The carrier later was detected in Simpson Harbor of Rabaul being patched up.

A Snooper mission generally will cover well over 2,000 miles and nothing is too small to escape attention. Admiral Halsey, Commander of the South Pacific, said he was gratified with "the manner in which your searchers and Snoopers put the hot foot to shacks, barges and even canoes."

One day a Snooper caught a Jap submarine between Bougainville and New Britain. The sub went down—or so the Snooper reported. But the next day a search plane found it on the surface in exactly the same spot where the Snooper reported bombing it. The sub didn't move. It just dove whenever one of our planes appeared. And judging from the frantic work going on aboard, it was apparent that the Snooper had wrecked everything on the sub but its ability to surface and submerge. For the next three days "Bob and Joe," as the sub was affectionately called, was the delight of every plane that passed. All tried to catch it on the surface, but a destroyer finally sank it.

Then there is the story of one of our own subs that had been stalking a merchant vessel. Just as it was moving into position to let go a torpedo a string of bombs came out of the sky and the Jap merchantman went up in flames. The sub commander complained bitterly when he put into port and learned that a Snooper had beaten him to his prey.

One of the most important factors in the success of a mission is weather. Due to the length of Snooper missions, which makes every drop of gas count, they cannot afford to fly around weather but must go through it.

Lt. Clayton F. Seavers, of Cleveland, Ohio, a veteran Snooper navigator, tells of a new navigator he was breaking in on the electronic navigating equipment during a practice mission. When a bunch of weather was sighted ahead, Seavers let the neophyte solve the problem his own way, which was simply to go some 100 miles off course to skirt the turbulence.

The new navigator was quite proud of himself until Seavers explained that if it had been a combat mission, that extra 100 miles would have exhausted their gas supply many miles short of home base. He left it to the other navigator's imagination to figure out the fate of a heavily over-loaded B-24 and its crew in a crash landing. It is possible to get out, but there are easier ways to complete a tour of duty.

The new navigator listened, but was not convinced that the electronic navigating device could have done any better, could have taken them safely through the weather. Seavers bided his time; it came on the next combat mission. A few hours out, bad weather was indicated some time before it actually was visible in the sky. Seavers saw that it was bad, and so did the new navigator.

"We've got to go around it," said the new navigator.

"We can't afford the gas," countered Seavers.

"Then we'll have to turn back," said the new navigator.

"Snoopers don't turn back because of rough weather," said Lt. S.

"Then what do Snoopers do?"

"Find the safety zones on the equipment and weave their way through the weather. Go ahead, try it."

"All right," said the new navigator dubiously, but settling down to work. He became engrossed and fascinated as he picked his way along, shouting instructions to the pilot. Then the blackest and biggest front he had ever seen in the sky or textbooks loomed up ahead, and he hesitated.

"Go ahead, you're doing fine," encouraged Seavers.

When the B-24 pushed along and squeezed through a narrow space between two perilous fronts to emerge into a clear sky, no one drew a deeper sigh of relief than Seavers. He didn't tell the new navigator that it was a miracle that there had been that opening and more so that they had found their way through it. He did know that the new navigator had been sold on Snooper ways and was one of them.

Selling Snooper ways to new crews is an old story to the veterans. New crews listen to lectures, are exposed to practical demonstrations, read reports of successful employment of the special technique. More often than not they are decidedly suspicious of the low 1,500-foot bombing altitude, consider the electronic devices so many fancy gadgets, insist that navigation is navigation and not a mysterious interpretation of lights and shadows on a screen. So, they do it their own way. Their bombs splash harmlessly wide of the target they "had in the bag." Then they start wondering if they know it all. And that is what the veterans have been waiting for.

"Look here," they say. "You've tried it your way and washed out. Now why not try it the Snooper way?"

"That's all right for you to say," is the retort. "You've completed your missions, sunk your ships and waiting to go home."

"Well, isn't that proof enough that it works?"

That usually hits home. "OK, we'll give it a try your way."

Once is enough. To paraphrase an automobile manufacturer's sales slogan, the evidence of the effectiveness of Snooper tactics is to "ask a crew that has tried it." It gets in the blood. The hunting instinct is aroused. To get a ship becomes an obsession.

Time after time, bombardiers who have an enviable record of bombing land targets behind them seek out Capt. Fred S. Howell, of Jerseyville, Ill., in charge of Snooper electronic equipment and development, to ask for help.

"I've almost finished my missions," pleaded one, "and I haven't gotten a ship yet. You know, captain, I'd be one hell of a Snooper to go back home without at least one Jap ship to my credit."

The captain, a dyed-in-the-wool Snooper, understands. He coaches the bombardiers in all the fine points and tricks of the plane's special equipment. In fact, there are those who say that Captain Howell deserves a share of the credit for every ship the outfit sinks.

This passion for going after Jap ships, small and large, in any number, sometimes backfires. Take the case of the Snooper plane on which Lt. Charles W. Binford, of Miehaux, Va., was pilot, and Lt. James L. Lockwood, of Hampton, Va., navigator.

"We were out over the Sulu Sea on a sea search," began Lieutenant Lockwood. "That means we weren't carrying bombs, just a pile of gas."

"Our job," cut in Lieutenant Binford, "was to report something the brass hats call the 'trend of Jap shipping,' whatever that is."

"Well, anyhow," continued Lockwood, "it was the night

(*Continued on Page 60*)

Proud Partisan stands guard over B-24 that made forced landing. Partisans are always eager to help.

Working conditions are primitive. There are no shops, no hangars, no cemented taxiways and all work is done under the open sky and in the mud, as photo shows.

A BIT OF HEAVEN

A handful of grimy, grizzled mechs of the 15th Air Force are operating an emergency landing field on one of the tiny islands of the Dalmatian group, a field that looks like heaven to crewmen whose planes are struggling back from raids over the Balkans and Central Europe. Since these mechs first pitched their tents in June, 1944, among the grapevines which surround the field, they have repaired over 300 bombers and fighters and have cared for 2,000 pilots and combat crewmen. Some 30 planes have been hauled into the fields to be scrapped.

"We've had as many as 37 planes come in for help in one day," says Capt. S. R. Keater, commanding officer. "Some of them are only out of gas, but some are so badly shot up that it's a case of land on our island or take a header into the ocean. When things pile up too fast and the runway is jammed, the hopeless cripples, which can't circle until we clear the runway, are abandoned by their crews who parachute to safety while their planes go down."

This two-story stone farmhouse serves as headquarters building. Men live in nearby port town.

This P-38 nosed over during landing. It is a common sight to see 50 Yugoslav women raising overturned fighters to free pilots, often very badly injured.

BATTLE HONORS

Out of the bitter air battles of the last three years have come stories of heroism and triumph unsurpassed in the annals of warfare. Here AIR FORCE presents a chronology of the AAF units which have received Distinguished Unit Citations "in the name of the President as public evidence of deserved honor and distinction." The chronology includes citations officially recorded at Headquarters AAF up to January 1, 1945, except those which cannot be revealed for security reasons. In the future, AIR FORCE plans to report in somewhat more detail each citation as it is recorded.

The brief summaries of the actions are presented in the wording of the original citations as published in General Orders of the War Department. It may be pointed out that almost invariably the citations acknowledge the contribution of the ground echelon to the success of the combat achievement. Units that have been cited more than once are entered at the appropriate dates for the various citations.

The Distinguished Unit Citation should not be confused with the Presidential Unit Citation, the group award of the United States Navy. Both are awarded in the name of the President. The Army, however, has not borrowed the name of the Naval award, and the ribbons are different. The Army's ribbon is the familiar dark blue bordered in gold. Personnel assigned or attached to the organization and physically present and at a normal post of duty with that organization on the occasion or at any time during the period for which the citation was made may wear the Distinguished Unit Citation ribbon.

FAR EASTERN AIR FORCE — Dec. 8-22, '41
Engaged an enemy greatly superior in numbers and inflicted damage far out of proportion to its meager means, during first weeks of war in the Philippine Islands.

19TH BOMBARDMENT GROUP (H) — Jan. 1—Mar. 1, '42
Participated daily in attacking the enemy wherever they found him during his prolonged drive through the Philippines and Netherland Indies to Java.

5TH INTERCEPTOR COMMAND — Jan. 6, '42—Mar. 8, '42
Made a major contribution to the prolonged defense of Bataan and Corregidor by carrying out hazardous reconnaissance missions and attacking ground, air and naval elements of the enemy.

7TH BOMBARDMENT GROUP (H) — Jan. 14—Mar. 1, '42
Same citation as 19th Bombardment Group.

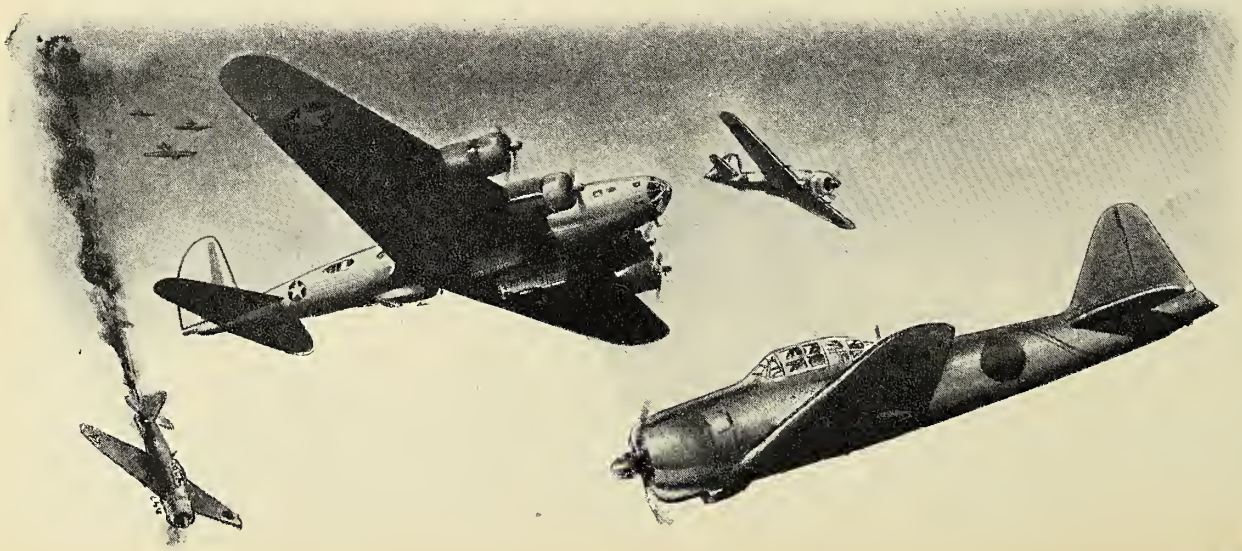
17TH PURSUIT SQUADRON (PROVISIONAL) — Jan. 14—Mar. 1, '42
Repeatedly entered into combat against a numerically superior enemy during the defense of Java and other South Pacific islands.

49TH FIGHTER GROUP — Mar. 14—Aug. 25, '42
Defended area near Darwin, Australia, though greatly outnumbered by enemy aircraft, and took toll far out of proportion to its own losses.

376TH BOMBARDMENT GROUP (H) — May, '42—Aug. '43
Conducted the first U. S. air combat operations in the defense of the then threatened Suez Canal area and later in support of the British 8th Army.

PAPUAN FORCES, U. S. ARMY, SW PACIFIC (AIR UNITS) — July 23, '42—Jan. 23, '43
Made possible the success of the ground operations which repulsed the Japanese drive against Port Moresby, by attacking enemy ground forces and convoys, and by transporting to, and supplying our forces in, the jungle.

11TH BOMBARDMENT GROUP (H) — July 31—Nov. 30, '42
Participated continually in attacking the enemy in his efforts to



obtain stronger foothold on South Pacific strategic territories.

)8TH BOMBARDMENT GROUP (H) Aug. '42—Aug. '43
Rendered an invaluable contribution to the success of our Allied forces from the beginning of the Middle East campaign to the capitulation of Sicily.

19TH BOMBARDMENT GROUP (H) Aug. 7-12, '42
Performed repeated long-range bombing attacks on heavily defended enemy airdromes and shipping in the vicinity of Rabaul (during the invasion of Guadalcanal).

435TH BOMBARDMENT SQUADRON (19TH BOMBARDMENT GROUP) (H) Sept. 10—Oct. 10, '42
Performed repeated long-range reconnaissance and photographic missions with unescorted single B-17E type airplanes over hostile areas in New Guinea, New Britain and the Solomon Islands.

374TH TROOP CARRIER GROUP Sept. 19—Dec. 22, '42
Utilized various types of unarmed aircraft to supply ground troops and evacuate casualties during the Papuan campaign.

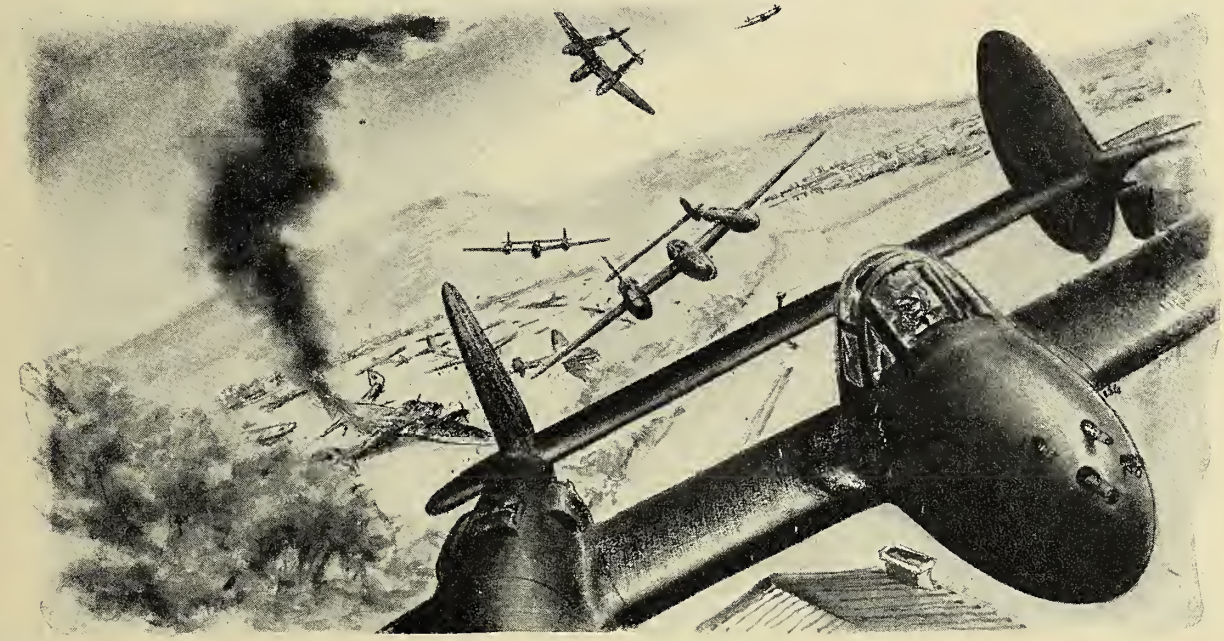
301ST BOMBARDMENT GROUP (H) Apr. 6, '43
Struck a decisive and crippling blow at a critical point in the battle for Tunisia by destroying an enemy convoy in Bizerte Harbor.

57TH FIGHTER GROUP (S) Apr. 18, '43
Participated in the destruction of 72 enemy aircraft including 58 transports carrying reinforcements to Northern Tunisia.

314TH FIGHTER SQUADRON (324TH FIGHTER GROUP) (S) Apr. 18, '43
Same citation as 57th Fighter Group (S).

44TH BOMBARDMENT GROUP (H) AND HQS. 66TH, 67TH AND 506TH BOMBARDMENT SQUADRONS May 14, '43
Successfully fulfilled hazardous mission of dropping incendiaries on naval installations at Kiel, Germany, after lead group had released high explosive bombs.

99TH BOMBARDMENT GROUP (H) July 5, '43
Played a major part in preparing the invasion of Sicily by heavy attacks on enemy airfield at Gerbini five days before our landings were made.



2TH BOMBARDMENT GROUP (M) Oct. 23, '42—Aug. '43
Contributed greatly to the defeat of the enemy in the Middle East while operating in direct support of the British 8th Army.

7TH FIGHTER GROUP (S) Oct. 23, '42—Aug. '43
Same citation as 12th Bombardment Group (M).

80TH ANTISUBMARINE GROUP Nov. 10, '42—Oct. 28, '43
Led Army Air Forces in the fight against the U-boat, carrying the offensive to the home waters of the enemy.

ND TROOP CARRIER SQUADRON Jan. 26—Dec. 31, '43
Operated its aircraft over some of the world's most rugged terrain performing vital transport and food dropping missions in CBI.

TH COMBAT CAMERA UNIT Feb.—Aug. '43
Participated in long and dangerous flights over enemy territory in the Middle East theater to bring back vital documentary photographs.

40TH BOMBARDMENT GROUP (M) Mar.—Aug. '43
Contributed directly to the expulsion of the Axis powers from Afriea and Sicily by bombardment attacks on airdromes, supply lines and ground units of the enemy

9TH FIGHTER GROUP (S) Mar.—Aug. '43
Made invaluable contributions to the success of our ground forces in the North African campaign, advancing with the front lines of the British 8th Army.

24TH FIGHTER GROUP (S) Mar.—Aug. '43
Same citation as 79th Fighter Group (S).

325TH FIGHTER GROUP (S) July 30, '43
Contributed directly to the surrender of the Island of Sardinia by destroying 21 enemy aircraft in a single half-hour engagement.

44TH, 93D, 98TH, 376TH AND 389TH BOMBARDMENT GROUPS (H) Aug. 1, '43
Participated in the 2,400-mile flight to attack the oil refineries at Ploesti, striking a blow at a vital enemy resource.

3RD BOMBARDMENT DIVISION (H) Aug. 17, '43
(INCLUDED THE FOLLOWING GROUPS: 94TH, 95TH, 96TH, 100TH, 385TH, 388TH AND 390TH)
Executed the first shuttle mission in the ETO, wrought destruction on aircraft factory at Regensburg, Germany, and destroyed 140 fighters in the air.

82ND FIGHTER GROUP (TE) Aug. 25, '43
Dealt a crippling blow to the enemy prior to the Salerno landing by the first mass long-range, low-level, strafing attack on the Foggia airdromes.

1ST FIGHTER GROUP (TE) Aug. 25, '43
Same action as above.

310TH BOMBARDMENT GROUP (M) Aug. 27, '43
Hastened the collapse of the enemy in Southern Italy by destroying the heavily defended rail yards at Benevento, key transportation center of the Naples-Salerno-Foggia area.

82ND FIGHTER GROUP (S) Sept. 2, '43
Escorted 75 medium bombers over 360 miles of water to the

target (Cancello marshalling yards near Naples, Italy) and back to their base so efficiently that all the bombers returned safely despite heavy enemy opposition.

321st Bombardment Group (M) Oct. 8, '43
Reduced strength of German XIth AF in the Balkans by persistent and extremely effective bombing operations, especially during a raid on this date on the Eleusis airdrome near Athens.

95th Bombardment Group (H) Oct. 10, '43
Despite lack of fighter escort, successfully attacked target at Münster, Germany, and destroyed 41 of approximately 250 attacking enemy fighters.

390th Bombardment Group (H) Oct. 14, '43
Rendered an invaluable contribution to the Allied war effort by seriously damaging vital industrial plants at Schweinfurt, Germany.

354th Fighter Group Nov. 4, '43—May 15, '44
Flew the first long-range escort missions in P-51s on bombing attacks deep in enemy territory (ETO).

India-China Wing, ATC Dec. '43
Exceeded substantially the tonnage objective set for the transportation of vital supplies to China by air during this month.

bombing the target, directed its fighter escort to protect the rear group in order to reduce the concentration of enemy aircraft against it.

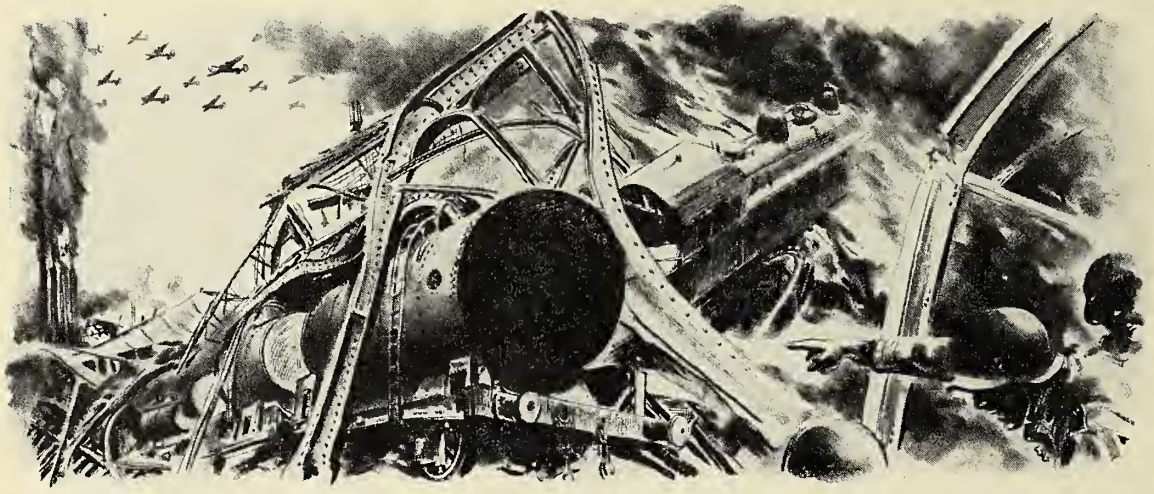
2nd Bombardment Group (H) Feb. 24, '44
Withstood concentrated enemy opposition while flying as rear group, without escort, in the attack of this date on Steyr, Austria.

451st Bombardment Group (H) Feb. 25, '44
Led an entire wing formation in a bombing attack on aircraft factories at Regensburg which completely destroyed the target despite intense enemy resistance.

301st Bombardment Group (H) Feb. 25, '44
Inflicted heavy damage on enemy aircraft factories at Regensburg, Germany, despite lack of fighter escort to target, and withstood attack by approximately 200 enemy aircraft.

319th Bombardment Group (M) Mar. 3, '44
Inflicted heavy damage on marshalling yards at Rome, bombing with such accuracy that adjacent religious and cultural centers were not hit.

4th Fighter Group (S) Mar. 5—Apr. 24, '44
By its determination, aggressiveness and will to engage the



17th Bombardment Group (M) Jan. 1—July 31, '44
Achieved the unparalleled over-all bombing accuracy average of 63.07% in 215 missions flown during this period (MTO).

1st Bombardment Division (H) Jan. 11, '44
(Consisting of the following groups: 91st, 92nd, 303d, 305th, 306th, 351st, 379th, 381st, 384th, 401st)
Led the 8th Air Force to its target in Central Germany and returned without fighter escort due to adverse weather conditions. Endured severe enemy attacks and is credited with the destruction of 210 enemy planes, largest total achieved by any division of the 8th Air Force on a single mission.

94th Bombardment Group (H) Jan. 11, '44
Successfully bombed an aircraft components plant at Brunswick, Germany, despite weather conditions which recalled most of the other planes and compelled the group to make a second run over the target in order to identify its objective.

325th Fighter Group (S) Jan. 30, '44
Neutralized the enemy's aerial defense at Villaorba, Italy, and made possible the success of the bombing attack which followed.

2nd Troop Carrier Squadron Feb. 1-29, '44
Supplied Allied forces isolated in Northern Burma with 5,661,725 pounds of war material, without which they would have ceased to be operative.

56th Fighter Group (S) Feb. 20—Mar. 9, '44
Engaged enemy aircraft over Occupied Europe, accounted for 98 enemy aircraft destroyed, 9 probably destroyed and 52 damaged for this period.

97th Bombardment Group (H) Feb. 24, '44
Led attack against an aircraft factory at Steyr, Austria, and after

enemy, destroyed 189 enemy aircraft in the air and 134 on the ground during this period in the ETO.

319th Bombardment Group (M) Mar. 11, '44
Repeatedly demonstrated superior bombing accuracy during critical periods in the Italian campaign, including a highly successful attack on this date on marshalling yards at Florence.

307th Bombardment Group (H) Mar. 29, '44
Flew approximately 1,700 miles over water to attack Japanese base at Truk in coordination with naval task force operations in that area.

455th Bombardment Group (H) Apr. 2, '44
Scored direct hits in face of enemy attack on important unbriefed target after finding the assigned target at Steyr, Austria, obscured by clouds.

14th Fighter Group (TE) Apr. 2, '44
Assured the success of a bombing attack on enemy ball bearing works in Austria by effectively protecting the bombers it was escorting.

449th Bombardment Group (H) Apr. 4, '44
Successfully attacked rail facilities in Bucharest despite bad weather that made the planned rendezvous with other groups and wings impossible.

451st Bombardment Group (H) Apr. 5, '44
Attacked enemy oil installations and marshalling yards at Ploesti despite difficult conditions on the ground and adverse weather in the air.

350th Fighter Group (S) Apr. 6, '44
Contributed to the success of Operation "Strangle," a vital phase of the Allied effort which resulted in the liberation of

Rome; brilliantly accomplished a variety of missions over vast areas and against great odds.

64TH TROOP CARRIER GROUP
4TH TROOP CARRIER SQUADRON OF THE
62ND TROOP CARRIER GROUP — Apr. 7—June 15, '44
Gave desperately needed support to ground units fighting in the Imphal Valley and the Myitkina areas of Burma.

96TH BOMBARDMENT GROUP (H) — Apr. 9, '44
Accurately bombed highly important aircraft factory at Poznan, Poland, despite generally adverse weather which caused other aircraft to abandon the mission and intensified enemy resistance to this group.

461ST BOMBARDMENT GROUP (H) — Apr. 12-13, '44
Carried out attack on an aircraft plant at Budapest despite severe weather conditions and heavy enemy attack on unescorted planes.

57TH FIGHTER GROUP (S) — Apr. 14, '44
Carried out low-level strafing and dive-bombing attacks in the Italian operations of early April, 194, and on this date flew six missions in which great damage was done to enemy communications in the Florence-Arezzo area.

7TH PHOTO GROUP (RECONNAISSANCE)
May 31—June 30, '44
Apart from regular reconnaissance duties, voluntarily undertook the most hazardous missions in order to further invasion plans and operations in Europe, sometimes converting from high altitude photo reconnaissance to tactical reconnaissance at medium to low altitudes.

61ST, 313TH, 314TH, 316TH, 434TH, 435TH, 436TH, 437TH, 438TH, 439TH, 440TH, 441ST AND 442ND TROOP CARRIER GROUPS — June 5-6-7, '44
Participated in the initial phases of the European invasion, delivering paratroops and releasing gliders carrying airborne infantrymen to their assigned areas.

315TH TROOP CARRIER GROUP — June 5-6, '44
Carried out night dropping operations in early hours of European invasion despite adverse weather conditions and alerted enemy defenses.

52D FIGHTER GROUP (S) — June 9, '44
Provided penetration, target and withdrawal cover for a bombing mission against targets in Munich, Germany, with such protection to the bombers that all returned safely.

31ST FIGHTER GROUP (S) — Apr. 21, '44
Destroyed 16 of 60 enemy planes it engaged after flying 580 miles through almost insurmountable weather conditions, as escort to a bombing mission in the Ploesti-Bucharest regions.

459TH BOMBARDMENT GROUP (H) — Apr. 22-23, '44
Completed a mission against the Bad Voslau aircraft plant in Austria despite desperate resistance by large enemy formations.

99TH BOMBARDMENT GROUP (H) — Apr. 22-23, '44
Led a successful mission against enemy aircraft factory at Wiener Neustadt, Austria; all aircraft returned safely to base despite severe air and ground resistance.

320TH BOMBARDMENT GROUP (M) — May 12, '44
Achieved spectacular results in attacks on heavily defended enemy troop concentrations, in cooperation with the Fifth Army's advance toward Rome.

463D BOMBARDMENT GROUP (H) — May 18, '44
Persisted in a bombing mission against Ploesti oil installations, despite weather conditions that caused all other units to abandon the mission, and bombed the target despite fierce opposition by enemy aircraft.

1ST FIGHTER GROUP (TE) — May 18, '44
Provided withdrawal cover for the mission of this date against Ploesti oil installations, and destroyed 10 of 80 enemy fighters which attacked the bombers.

86TH FIGHTER GROUP (A-36S AND P-38S) — May 25, '44
Made an outstanding contribution, in the Frosinone-Cori-Cescano area, to attacks which so crippled the enemy's transportation system in southern Italy that he was forced to abandon his projected defense of Rome and retreat northward.

464TH AND 465TH BOMBARDMENT GROUPS (H) — July 7-8, '44
Attacked vital oil installations at Vienna, Austria, despite intense enemy opposition.

449TH BOMBARDMENT GROUP (H) — July 9, '44
Successfully bombed oil installations at Ploesti, using PFF methods which penetrated enemy smokescreens that had caused other bombers on this mission to miss the target.

461ST BOMBARDMENT GROUP (H) — July 15, '44
Led a bombing mission against oil refineries at Ploesti and successfully used Pathfinder equipment to penetrate enemy smokescreens and focus the bombs of the entire formation on the target.

483D BOMBARDMENT GROUP (H) — July 18, '44
Destroyed all major installations of a target at Memmingen, Germany, and withstood concentrated attack by the enemy, destroying or damaging 62 of his aircraft.

31ST FIGHTER GROUP — July 25, '44
Completed a strafing mission over Poland in P-51s and while returning to its base in Russia, encountered a large force of enemy dive-bombers, destroying 27 of them.

885TH BOMBARDMENT SQUADRON (H)
(SPECIAL) — Aug. 12, '44
Gave much needed assistance to French Forces of the Interior in a night dropping operation carried out on an instrument flight of over 1,200 miles.

484TH BOMBARDMENT GROUP (H) — Aug. 21-22, '44
Inflicted great damage on Lobau Underground Oil Storage in Vienna despite extremely adverse weather conditions and heavy enemy resistance.

They've Got Yo

BY SGT. LOUIS W. DAVIS
Army Airways Communications System

There was a brief lull in the Navy fighter and bomber traffic at Tacloban airstrip, Leyte, on A-day plus 5. A tired, hungry radioman of the Army Airways Communications System, one of the crew which had waded ashore on Leyte's White Beach three days before, removed his headphones, leaned back to relax a moment and turned to a fellow operator.

"Well, Mack," he said, "headquarters can hang up another red pin on that Pacific airways map. We're on the air—and how!"

These radiomen were doing again what AACS detachments had done time and time again in the Pacific, European and CBI theaters. They had gone in early to establish radio communications channels for the air traffic which would be coming along later. Until the airstrip was finished, they were to unpack transmitters, dig foxholes, erect tents, broadcast weather reports provided by AAF weather observers, and send and receive operational messages. Upon completion of the strip by the engineers, their task of PX-ing air traffic at Tacloban was to begin.

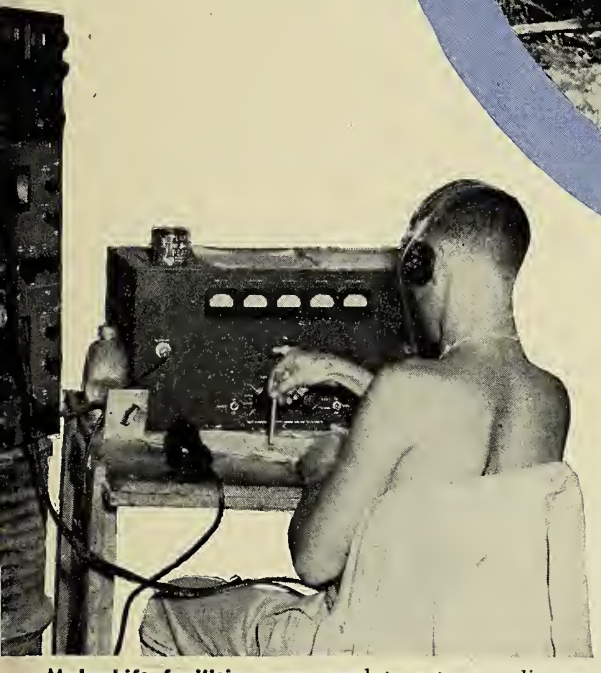
Tacloban airstrip was scheduled for its official opening on A-day plus 7, which would have been October 27, 1944, but the men who planned that schedule didn't know that nearly 100 Hellcats, Avengers and Helldivers, deprived of their jeep carrier bases by Jap shelling, were to arrive five days after A-day (see "Back to the Philippines," AIR FORCE, December, 1944). They neglected to note on that schedule that these Navy aircraft would be landed on the strip which was unprepared for anything larger than an L-4, that they would be repaired, refueled, rearmed and cleared off again to hit at the Jap fleet. The authors of the schedule might have scoffed at the thought of radiomen handling 200 landings and take-offs during a 20-hour period, just 3 days after wading ashore. But, that's what happened.

The AACS radio team at Leyte, and the others who went ashore at Saipan, Peleliu, Emirou, Green Island and Lae, are part of the AACS Pacific Wing, operating joint Army-Navy communications. This wing is one of eight covering

Life is no easy lot for weather and communications personnel who man the AAF weather station perched atop this frigid arctic ridge.

Covered

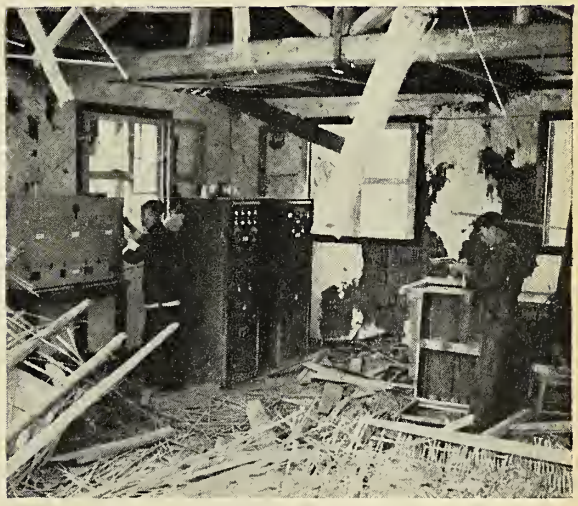
AACS men with the Green Island invasion forces spent the first days hacking away thick jungle growth before they set up shop.



Makeshift facilities were used to set up radio communications at the newly won airstrip near Myitkyina.

No matter where you fly over more than 100,000 miles of military airways, the AACS keeps a watchful radio eye on you—

Radio range transmitter towers rise above the windswept snow blanket which covers this station on the North Atlantic air route to the European theater.



Japanese bombs damaged this station in China but radio communications continued without interruption.

AAF airways which stretch through the States and 52 foreign countries and territories. These men are among the 30,000 officers and enlisted personnel—including Wacs serving in the U. S.—who are operating and maintaining communications and navigational aids along 100,000 miles of military air routes at 1,000 stations.

Other accounts of AACS radiomen at work may not equal the Leyte story for its drama, but they are indicative of the over-all job being performed.

Cpl. J. C. Melton, radio maintenance mechanic, was over 10,000 miles from Leyte in the winter of 1942. But he, too, was fighting a war—a war against the bitter cold and isolation of the Arctic. Melton and his crew of AACS GIs had a job to do in the power generator shack at Crystal Three weather station which had been set up on Padloping Island in the Canadian Northwest. The water pump on the only remaining Ford V-8 power generator had become defective, and it was up to Melton and his men to keep the plant going as the only source of power for radio and lights. They made their own cooling system and worked in shifts for days, dumping snow into a steaming oil drum which had been connected by hose to the generator.

Fort Lamy, French Equatorial Africa, lies 7,500 miles west of Leyte's White Beach. It was at this sun-baked, dust-covered airport that S/Sgts. William Tindell and John G. Koch, Jr., crawled from a plane on October 13, 1942, armed with a screwdriver and a rusty pocketknife. They were to keep Fort Lamy on the air with existing radio equipment so that aircraft could use this base for refueling on their flights from Accra to Cairo and the Middle East. Sweating out contacts in a thatched roof hut at 120 degrees in the shade and fighting dust storms which grounded radio transmitters rated priority in their personal kind of war.

Sgt. Robert A. Coop, one of five AACS men setting up radio at Momote airstrip in the Admiralties last March, knew that infiltrating Japs weren't particular as to whom they picked as targets. Radioman or not, he dug foxholes and put his carbine to good use.

Behind these men is the AACS organization of eight wings under the command of Col. Ivan L. Farman. At the time of the AACS' activation on paper in 1939, few even dreamed that these air-roads in four short years would extend from Tacloban airstrip at Leyte, through San Francisco, to Kunming, China.

The global network of the AACS today renders the following specialized services: air traffic control through airdrome control towers and ground-to-air stations; weather and operational communications lines via a point-to-point system of radio and landline facilities; route navigational aid to the pilot through an integral system of radio ranges, homing beacons, direction finder nets, instrument landing approach units and other radio aids still classified.

The first major AACS assignment came in late 1940. Its total strength of four officers and less than 100 enlisted men was scattered across the North Atlantic from Presque Isle, Maine, to Prestwick, Scotland. Capt. James Dyer with 11 enlisted men went by whale boat to Crystal Three. Others took up stations in Newfoundland, Labrador, Greenland and Iceland. Each set up temporary facilities in arctic weather until Signal Corps construction crews arrived to make them permanent and livable.

In sharp contrast to the trickle of bombers passing over these stations in 1940, weather permitting, are the traffic reports of round-the-clock operations today. ATC operates 500 scheduled round trips per month; it delivered 10,000 aircraft to the European theater in less than two years.

The North Atlantic AAF airway boasts of many firsts. It was the first military airway under construction; the first to hang up a 98.5 percent safety record, in 1943, and the first to be equipped for all-weather operation. It served as the springboard for AACS expansion to the operation of communications and navigational aids along the first established airways system around the world.

The military pilot using any section of the system today, receives the same service and aid as that described in the following typical flight over the Pacific:

The bomber pilot and crew of a B-24 are ready to take off from Hamilton Field, Calif., for Biak, New Guinea. They will fly this 8,500-mile overwater route for the first time, using several coral atolls for refueling and rest stops.

The first job of the pilot is to get the weather. Hourly reports on the 2,000-mile gap of ocean between Hamilton Field and his first stop, John Rogers Field, Honolulu, are available at Hamilton's AAF weather station. The weather briefing officer interprets the reports and provides the latest forecasts. From this intelligence, the pilot determines his most economical cruising altitude, considering favorable winds and bad weather which may be encountered. He estimates his ground speed and approximate time of arrival at Hawaii. Then he files his flight plan with Hamilton Operations for forwarding to the ATC Flight Control Center.

As the B-24's engines warm up, the pilot contacts Hamilton tower on his radio-telephone command set. Taxi clearance comes from the tower operator and the Pacific-bound bomber moves to take-off position adjacent to the runway in use. Here the engines are given a final run-up and the tower is contacted again for take-off clearance.

Tower operators regulate the movement of incoming and departing aircraft, thus providing air traffic control within the airport control zone, usually an area covering a radius of three miles in all directions. When the B-24 is cleared for take-off, the tower operator notes the time, and, by telephone or squawk-box, ATC flight control receives the time of departure from the tower. This data, together with the ETA, goes to the point-to-point operator for forwarding to John Rogers Field Operations.

From this point on, the pilot depends upon AACS air-to-ground radio communications. He has received clearance out of the control zone from the tower and now takes up airway heading while climbing to desired altitude. The navigator starts his 10-hour task of plotting positions and charting progress along the route. At regular intervals, the B-24 radio operator calls AACS air-to-ground stations via radio telegraphy or CW (continuous wave)—using the liaison set—to report the bomber's estimated position. Each time he transmits, AACS radio direction-finder nets take a bearing on the radio signals and check the reported position. If the latter is off, further bearings are taken and the pilot is advised through air-to-ground station contact.

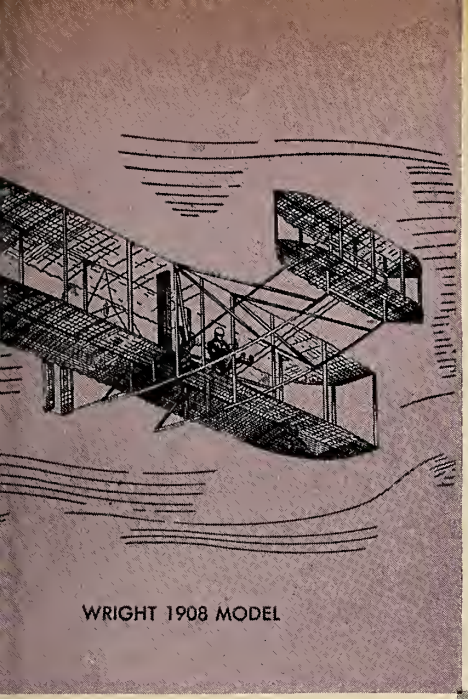
West Coast AACS serves the B-24 until it has passed the halfway position, over a 1,000 miles out. At this point, communication is switched to the Hawaiian system of the 7th AACS Wing. En route, the B-24 radio operator keeps a check on the weather ahead and transmits any changes in conditions encountered by the plane to air-ground stations.

When the B-24 is within 500 to 600 miles of Hawaii, the radio range or homing beacon signals are audible. The pilot tunes to the frequency of the aid desired and flies a direct line of approach to John Rogers Field.

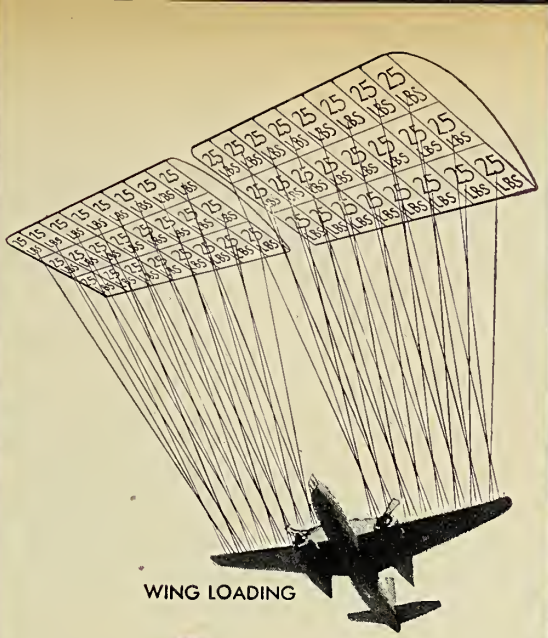
Some 15 miles from John Rogers Field, the pilot contacts the tower, reports his position in the area and asks for landing instructions. The tower assigns the B-24 a position in the landing pattern within the control zone. The pilot also keeps his command receiver on the tower frequency and listens for instructions from the tower which are pertinent to his safe conduct through the traffic area to the landing.

Should low ceiling conditions at the airport require in-

(*Continued on Page 59*)

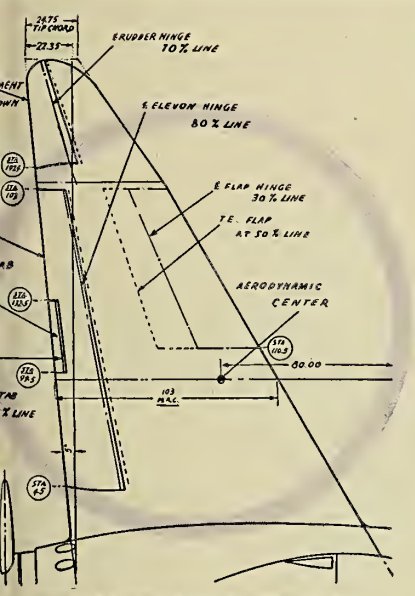


WRIGHT 1908 MODEL



WING LOADING

B-29 EMPENNAGE



WING PANEL ON TAILLESS PLANE

B-29

DESIGN: key to air superiority

BY MAJ. ROBERT V. GUELICH AIR FORCE *Staff*

MONOCOQUE FUSELAGE CONSTRUCTION

AIRFOIL TYPES

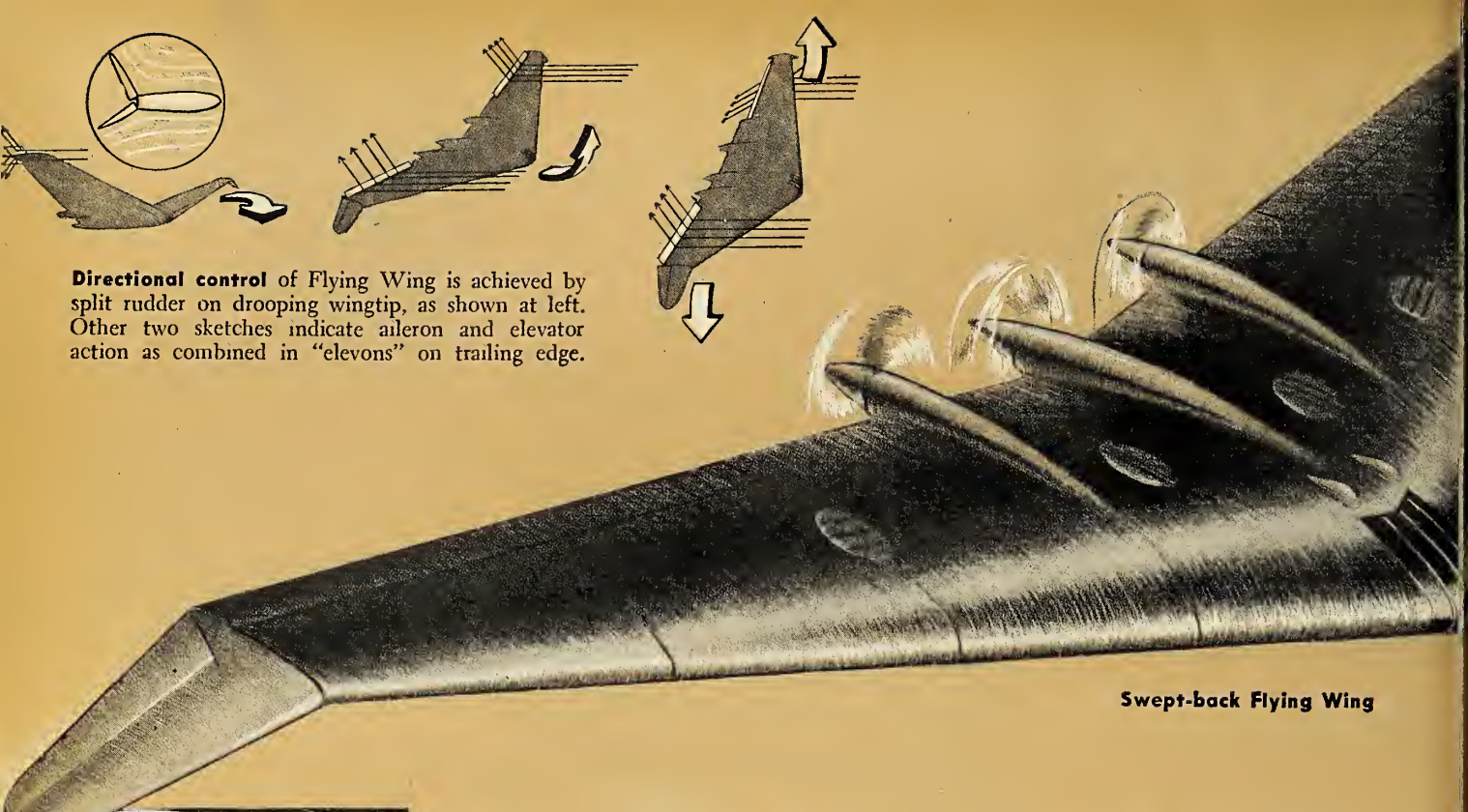
Key to air superiority is design—the shaping of wings, fuselages and control surfaces, the harnessing of power, and the arming of airplanes as more deadly weapons that can fly greater war loads farther, faster and higher than any enemy aircraft while preserving the maximum of safety for our crews.

World War II has crystallized many trends in aircraft design—some old, some new—and has accelerated development of many radically different designs that may establish the pattern for aircraft of the future.

Advances in turbo-jet and rocket propulsion are accelerating development of near-wingless aircraft, such as robombs. At the other extreme of aircraft design is the all-wing aircraft, or Flying Wing, which is emerging from the experimental stage.

Since 1917, when experimental engineering became an integral part of Army aviation, "idea men" of the AAF constantly have been striving to make the airplane a better warplane. At Wright Field's Aircraft Laboratory, the basic problems now are to reduce airflow drag, to design high-speed wings that can fly beyond compressibility limits, to simplify control and improve stability, to adapt more powerful engines—conventional and jet—to all aircraft.

Directional control of Flying Wing is achieved by split rudder on drooping wingtip, as shown at left. Other two sketches indicate aileron and elevator action as combined in "elevons" on trailing edge.



Swept-back Flying Wing

DESIGN:

Fundamental principles of flight developed by such pioneers as Leonardo da Vinci, Lilienthal and the Wright Brothers, continue to provide the basis for all winged aircraft designs. Changes we sometimes call "revolutionary" are only modifications and refinements of the basic precepts.

The B-29 flies the same way, aerodynamically, as the first Army plane, bought from the Wright Brothers in 1909. But the wing of the B-29, because of its improved airflow characteristics, enables the Superfortress to lift 100 times the gross weight of the first military airplane. The B-29's four 2220-hp engines—each of which develops approximately 100 times the power of the *Wright Flyer*'s small gasoline engine—drive propellers that pull the big bomber at 9 times the speed of the Wright plane and for 50 times the distance.

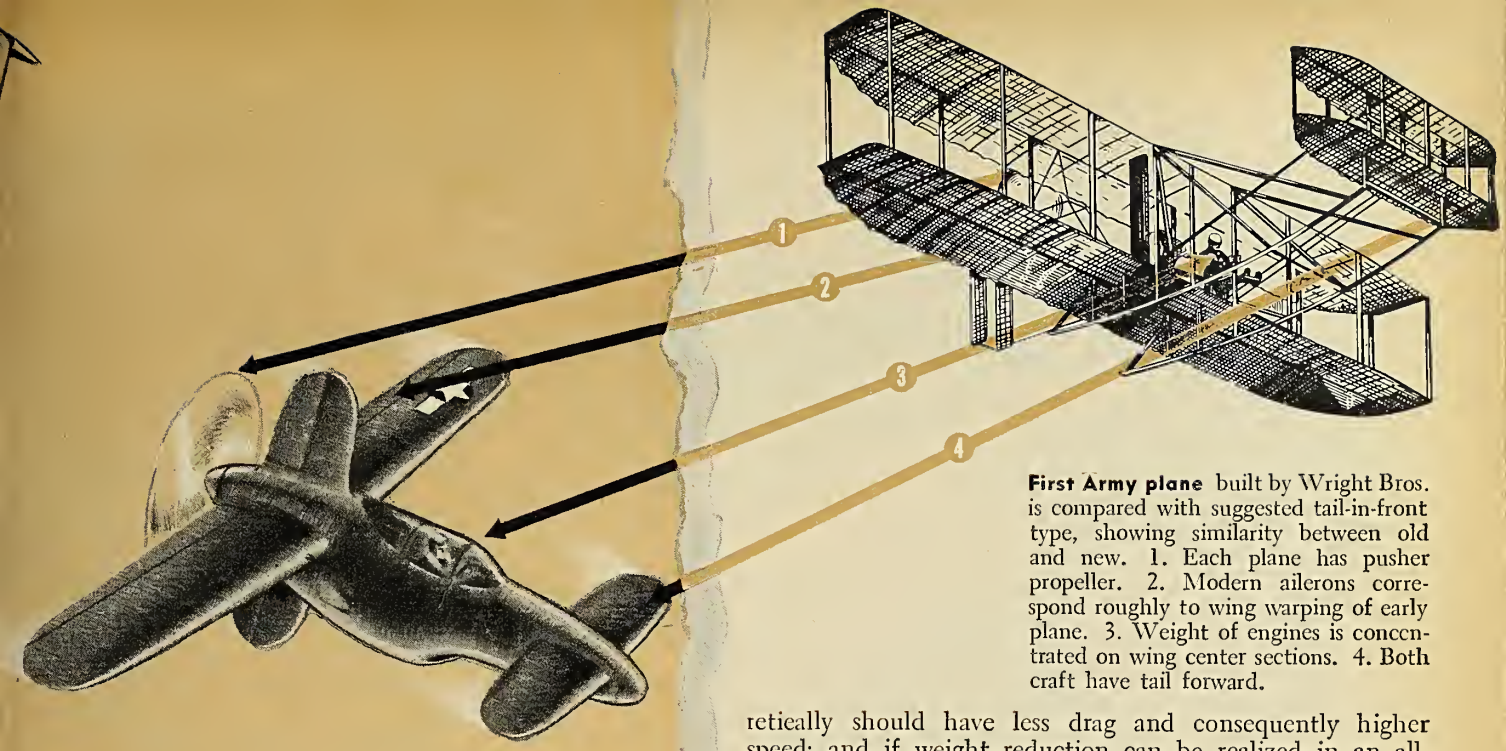
Progress of aircraft design has not been retarded by a "law of diminishing returns." Only limitation has been the rate of development of new materials, powerplants, methods of fabrication, carburetion and cooling radiators.

One major trend in wing development is toward the tailless airplane or the Flying Wing. Many elaborate claims have been made for this envisioned plane of the future, but because of its current limitations as an effective combat plane, its development has not kept pace with that of today's conventional aircraft.

The reason for such a design is obvious. Engines and payload are buried inside a large airfoil section, eliminating the drag of cockpit, fuselage, engine nacelles, rudder and stabilizers that disturb airflow around conventional aircraft.

A tailless airplane with less "wetted area" (surface exposed to the airstream) than a conventional plane theo-

Swept-forward Flying Wing



First Army plane built by Wright Bros. is compared with suggested tail-in-front type, showing similarity between old and new. 1. Each plane has pusher propeller. 2. Modern ailerons correspond roughly to wing warping of early plane. 3. Weight of engines is concentrated on wing center sections. 4. Both craft have tail forward.

retically should have less drag and consequently higher speed; and if weight reduction can be realized in an all-wing plane it should have superior climb characteristics. Combined, these factors would increase the range.

Under emergency conditions, conventional aircraft can be flown with relatively large variations in CG positions. But tailless aircraft with like variations in CG would not be flyable. This is one of the principal "bugaboos" that must be whipped before the Flying Wing attains practicability.

Flaps on conventional aircraft increase the lift of the wing at low speeds, but the pitching moment of the lowered flap can be trimmed out by elevators. In large tailless aircraft, elevator control is less effective and cannot economically compensate for high pitching moments which would result from use of large flaps. Therefore, increased lift can be obtained only by increasing wing areas, thereby reducing some advantages gained by elimination of drag and weight.

At present, tailless aircraft designs fall into two major categories—the "swept-forward" and the "swept-back" wing.

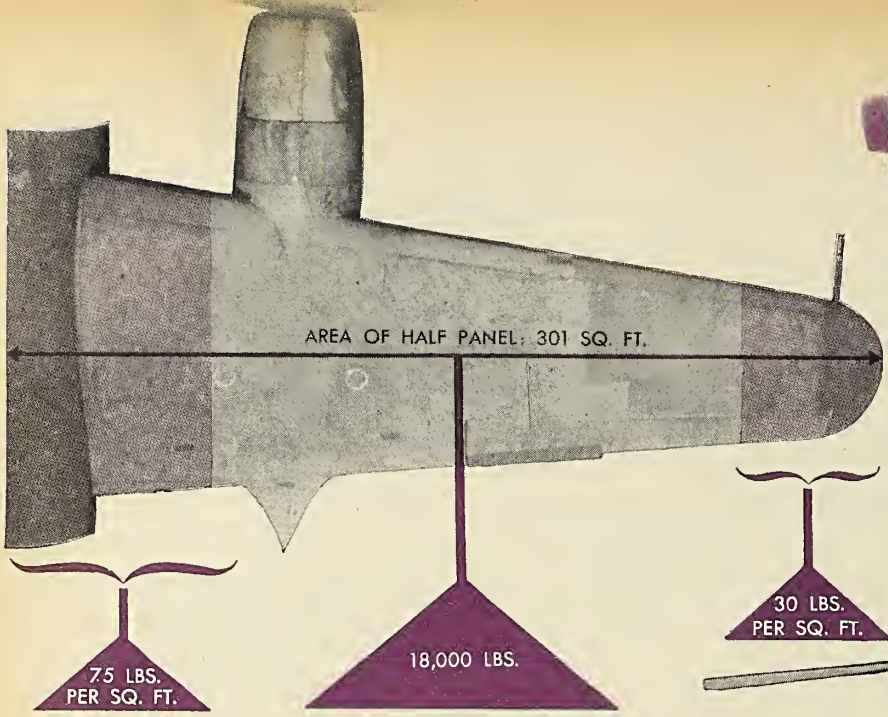
The swept-forward wing design eliminates the problem of wingtip stall, common to swept-back wings, and has control surfaces farther behind the center of gravity to increase controllability. This difference in control surface location also permits increase of the CG range. But this type of aircraft requires a partial fuselage—which in turn necessitates use of a vertical tail and rudder—properly to locate the CG ahead of the center wing section. While increasing directional stability and control, these modifications nullify some of the low-drag, low-weight advantages of the flying wing.

• As a fighter-type aircraft, however, the swept-forward design has some definite combat advantages over the swept-back design. The pilot can be located ahead of the wing in the small fuselage where vision is best; he also can fly the plane from a prone position, reducing the danger of black-out and increasing comfort. Armament can be concentrated in the nose where structural strength permits heavier-caliber weapons to be installed.

The "swept-back" design is best for bombers and transports since fuel and bombs can be located in the roomiest and the strongest part of the wing where effect on balance is minimized when bombs are dropped and fuel is consumed.

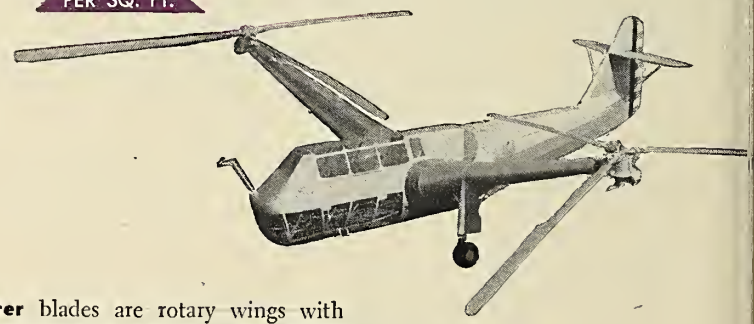
Test flights of prototype models of tailless aircraft indicate that chief advantages of this design may be realized only in the very large bombers and transports since the fighter designs do not have enough room for installation of the equipment now being carried by conventional planes.

Designer's Conception



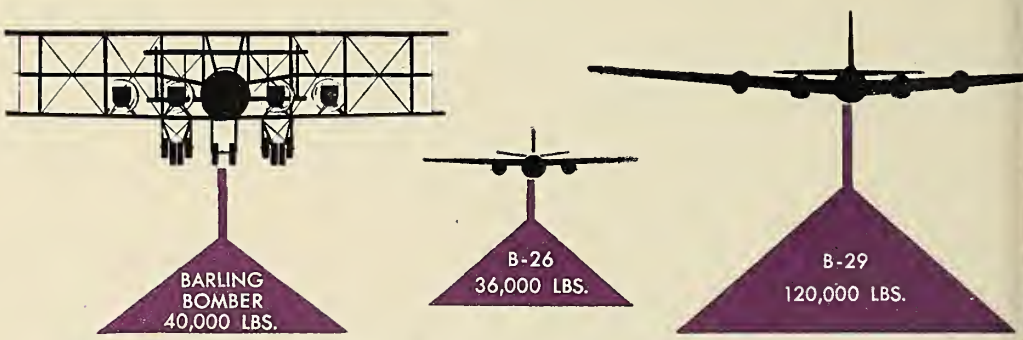
B-26 wing illustrates that as area of supporting surface decreases, load per square foot is lessened.

Wing having double taper design does not present smaller lifting surface than rectangular section, since width at tips and fillets give equal or greater area.



Helicopter blades are rotary wings with changeable pitch to give thrust and lift.

DESIGN:



Progress in wing loadings show that B-26 carries almost as much weight as obsolete Barling bomber, though latter has three wings, while B-29 trebles load with only slightly more span.

Since flight characteristics of an aircraft may be determined to a great extent by basic wing design, trends toward higher wing loading and thinner wing construction are fundamental and exert great influence in the design of conventional type aircraft.

Because an aircraft with a high wing loading requires more speed and greater distance for take-off than one with a low wing loading, aircraft design necessarily is compromised by the length of available runways, unless the plane is aided by assisted-takeoff devices. Various systems of rocket propulsion have been developed to step up the rate of acceleration and hurl the plane into air in one-half the distance normally required—this distance depending upon the amount and duration of the rocket thrust applied.

When tactical experience in this war revealed that most combat flight strips were long enough, or could be lengthened, to take care of any type of aircraft under development, design and use of planes with high wing loading were stimulated. Consequently, in the last five years the ratios of maximum speed to stalling or landing speed—sometimes referred to as speed ratio—have been increased on our aircraft by 50 percent.

At present, maximum wing loadings are in the range of 70 to 80 pounds per square foot in bombardment aircraft, and 40 to 55 pounds per square foot in commercial aircraft, which must land at lower speeds to abide by CAA regulations. Higher and higher wing-loadings can be adopted, but, as a general rule, not until additional horsepower per pound is harnessed in aircraft engines.

As military requirements have called for higher speed aircraft, designers have concentrated on development of thinner and more efficient high-speed wings to combat the effects of compressibility. Because a thick wing accentuates the airflow velocity ratio over its surface, compressibility shock waves are induced at lower speeds. It is for this reason that higher speed planes evidence a design trend toward smaller and smaller wings.

Continual increase in wing loadings and the compressibility demands for thinner wings have greatly increased wing structure problems. In bombers, reduction of the space inside the wing for loads such as fuel tanks—that tend to reduce the upward bending of the wing in flight—have to be compensated for by a heavier wing structure. In fighters too the thinner wing decreases the space available for such

items as landing gears, armament, etc., and creates the need for increased structural strength to withstand lift forces and torsional loads on the wing. Provision also must be made in such planes for placing fuel tanks in the fuselage since wing tanks, to fit into the thinner wing, must be reduced in size.

As stronger, lighter-weight materials are perfected, further reduction of wing area and wing thickness may be attained for high-speed aircraft.

While aluminum alloys continue to be most practical for aircraft structures, other materials are being improved to the point where they now are used in many liaison, training and cargo planes. Stainless steel is comparable to aluminum on a strength-weight ratio and holds considerable promise in future high performance airplanes having relatively thin wings with high wing loading. Therefore, it may be used to advantage on some planes when the required skin thickness is sufficient to provide smooth surfaces. Magnesium and beryllium alloys also are being adapted to some structural parts. Because high strength steel has low-creep characteristics at high temperatures it is being used more extensively in jet turbines.

Light weight, easily fabricated plastic and impregnated fibre glass already have been used successfully in experimental and production planes. Chief advantages of these materials are simplicity of design and construction, and their ability to be bonded continuously by "cement," eliminating the disadvantages of riveted and welded joints. The impact-absorbing characteristics of these new materials are particularly important for protection of combat aircraft against low velocity flak. Continuing experiments to determine resistance to weather exposure and extreme temperature variations will determine the limitations of these materials for general use in combat planes.

To improve the aerodynamic efficiency of conventional wings, some aircraft have been designed with pusher propellers to eliminate propwash over the wing. This type of powerplant installation was on the first *Wright Flyer*. Since then, such AAF planes as the Barling Bomber (4 tractors, 2 pushers), the twin-engine Bell Airacuda and the single-engine Vultee XP-54 adapted the pusher propeller principle.

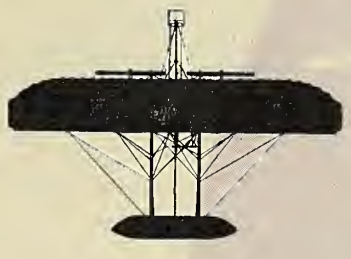
Chief disadvantages of this type of installation are that auxiliary cooling equipment for ground operations is necessary since airflow through the engine is reduced; a longer take-off run is required because the advantage of increased airflow speed over the wing of the tractor-type plane is sacrificed; pilots are reluctant to sit in front of propellers because of danger in bail-outs; stones are thrown into the propeller from the landing gear; flow of air over flaps interferes with airflow to the pusher propeller, forcing reduction of usable flap deflection in order to prevent large losses in propeller efficiency and consequent long take-off runs. In smaller types, ground protection for the propeller is necessary, so an extended tailwheel gear prevents the propeller from striking the ground at the planes' landing angle.

As these problems are solved, the pusher type airplane and the utilization of jet propulsion may offer advantages over conventional designs in pilot vision, forward angles of fire and improved airflow over the wing.

The more radical designs which visualize a pusher propeller behind the tail are confronted with the serious problem of properly locating the engine without making the plane tail-heavy. Extension shafts for the propeller can be used if the design offers enough advantage over our present planes.

Use of pusher propellers on large bombers, possibly in combination with tractor propellers, or "pusher" jets with tractor propellers, may prove to be practical applications of this type of powerplant installation.

Tail-first pusher type aircraft are of interest to designers



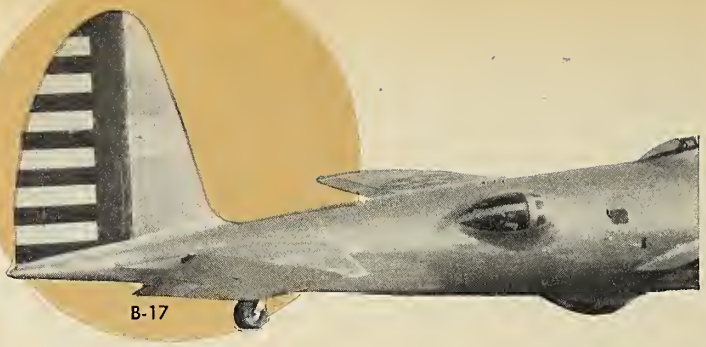
Wing of Wright Bros. 1908 model had wire trailing edge.

B-24 uses Davis wing with a reverse curve at trailing edge.

P-63's laminar flow airfoil has thickness toward the rear.

Symmetrical airfoil features Flying Fortress's wing profile.

Future planes of supersonic speed may have angular airfoil.



Representative empennage assemblies illustrate trend toward reduction of drag. Above, B-17G tail is compared with old type, while twin-boom structure of P-61, below, streamlines engine nacelles. Constellation and Liberator rudders, at left, typify tendency toward repair accessibility and space saving.

DESIGN:

Primary function of bombers is to carry destruction to enemy, and increased explosive loads affect fuselage design. Elongated bomb bay of A-26 adds no beauty lines but holds aerial torpedoes for shipping attacks.

because they require little compromise in forward field of fire and can house practically any combination of armament. Problems of instability and control, attributable to the forward location of the elevator in respect to the wing, must be solved before more extensive experiments can be made to determine the practicability of such aircraft.

Design developments of greatest military importance in this war have been the unglamorous ones that have rapidly improved performance of our conventional aircraft—a new ducting system for an oil cooler, a small strip of fairing, a change in the weight distribution, refinement of control surfaces, lengthening of bomb bays to hold larger bombs. These are the basic steps that chart the course for some trends in the design of our planes tomorrow.

Surface drag, resulting from the tendency of air to cling to the airplane skin instead of sliding over it, proved to be so important that we abandoned the use of camouflage paint in favor of smoother unpainted metal where the military situation permitted. In tests with a P-51, removal of the rough paint surface increased top speed approximately 40 mph at its critical altitude.

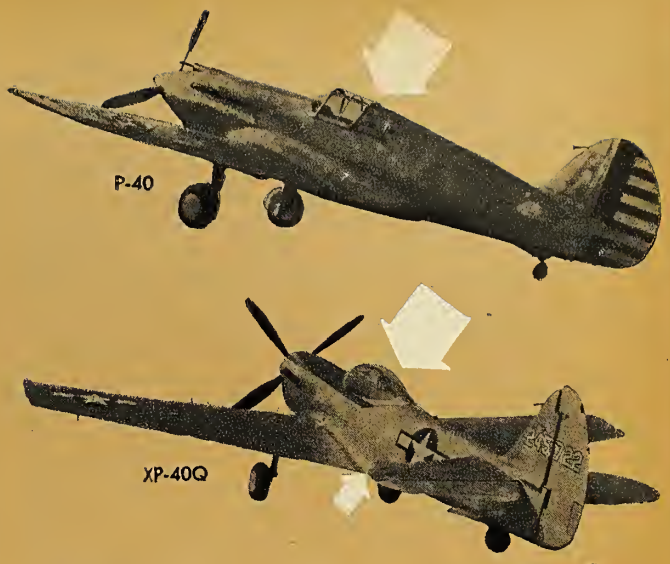
To reduce external drag to a minimum, the "laminar flow" airfoil was developed and flush-rivet, spot-weld and plastic cement methods of joining parts are being utilized to obtain smooth surfaces in fabrication. Antennae have been streamlined and in some cases removed from the airstream; turrets have been cleaned up aerodynamically, to some extent, and some now are retractable. Fillets have been designed to fill up angular joints that had prevented smooth

airflow along the fusclage at wing or tail intersections. These modifications require hundreds of hours of designing and testing but pay off in additional speed, range and handling characteristics of original plane designs.

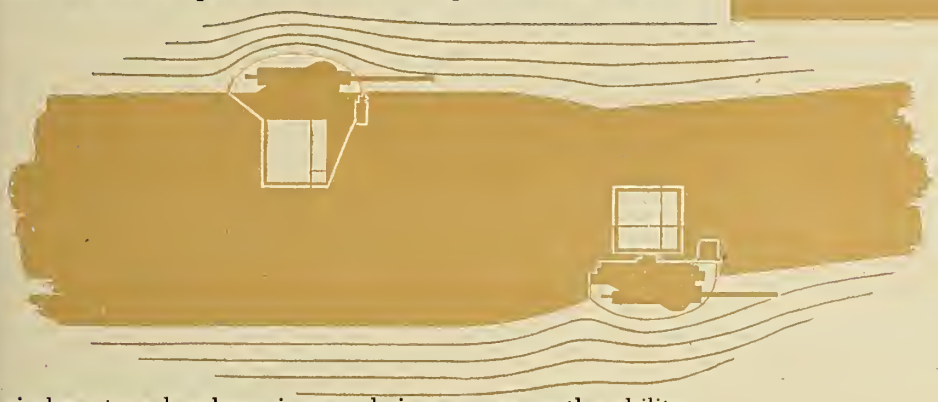
At one time not so many years ago, the layman regarded a twin-boom arrangement as a radieal design change. Actually it does increase the weight of an aircraft, but as an extension of the engine naeelles, it is simply an aerodynamic refinement—redueing drag by smoothing out the airflow behind engine nacelles. One test conducted by the AAF revealed that extending the engine naeelles two feet increased the speed of a eonventional aircraft approximately 10 mph by smoothing out the airflow.

The twin-boom, twin-tail design, further extends the nacelles to the tail assembly, provides room for more equipment in the booms and permits reduction of the size of the center fuselage. Also, its tactical advantages are better dispersion of defensive armament, improved forward and rear vision. Side vision, however, may be poorer than in other arrangements. The twin-boom arrangement and the pusher type aircraft represent attempts to reduce drag and improve aerodynamic effieieney of specialized aircraft.

Overall design development during the war has emphasized a trend to specialized aircraft. As performanee of eaeh



Bubble canopy on experimental Warhawk smoothes airflow over fuselage, and reduced fairing on XP-40Q, (small arrow) cuts down on parasite drag, increases speed.



Installation of remote-control gun turrets has eliminated protruding domes, since gunner may be placed elsewhere in plane. The sketch at left shows upper and lower RCT (remote controlled turrets) of the A-26.

airplane type has been increased, in some casc the ability to perform alternate missions has been reduced. A high altitude escort fighter may bc handicapped in speed and maneuverability at low altitudes where it may be less efficient and wherc its supercharger and oxygen equipment are dead weight. A heavily armed, low altitude attaek bomber substitutes guns and ammunition for the bombs, gasoline and bombardier that are needed on a medium altitude preeision bombing mission. Our planes can perform alternate missions, and in emergeneies frequently are modified as combat eonditions change, but performance usually is not as satisfactory as when the plane is designed for only one specific type of mission.

The performanee and utility of our pre-war aireraft have been greatly improved during the last three years. Whenever possible, neeessary changes have been built into production line planes. However, extensive modifieation leads to development of new aireraft—A-20 to A-26, P-39 to P-63, B-17 to B-29—which will in turn be improved until they reach the limits of their development when another new design will be put in production. Some of these planes of the future already are being flown experimentally. Meanwhile, creative designers are engrossed in solving the problems of compressibility, determining the effeets of adiabatic heat (heat of compression generated by high-speed flight), and searching for improved control devices that will enable our planes to hold the aerial superiority they are winning. ☆

This is the first of two parts on "Design—Key to Air Superiority." The second will appear next month.

More mph are added to fighters through relocation of airscoop. In XP-40Q, vents in wing divide job, while in P-63, at bottom, scoops are built right into airfoil.

ISOLATING THE BATTLEFIELD

(*Continued from Page 9*)

or less brought to a halt by our own increasingly difficult supply problem. We covered so much ground so fast that we simply had to pull up, reestablish our supply lines, fill our new advance dumps, repair or construct airfields within easier reach of the new lines, reorganize our troops, and in general get ready for another push ahead.

In this sense, even the most successful advance is self-limiting. Modern warfare imposes this limitation because the modern army, particularly the modern army in attack, requires an overwhelming supply of ammunition, gas and munitions of all kinds. The Germans suffered an enormous defeat in France. They were greatly weakened by losses of men and materiel. One circumstance, however, favored them: while we were leaving our main sources of supply farther and farther behind, they were getting closer and closer to their main sources with every mile of their retreat. This logistical movement is like that of a spring; power increases under compression. We had to get new bases so that we could push our spring up and get force into it again.

The Germans, who are good soldiers and always pretty much on the ball, took the fullest possible advantage of our pause. We can't pretend to know exactly what went on in the minds of the German High Command, of course, but several fairly safe assumptions can be made. They knew that we were going to have to pull up, and that we would be capable of no serious, full-power thrust for a certain number of weeks after we stopped.

They knew that until we got the port of Antwerp, we simply could not bring in the volume of materiel which a full-scale offensive would require.

When we finally got Antwerp and opened the port, the German High Command must have known that it would not be long now. We were pressing their armies, and pressing them hard, at point after point from the North Sea to Switzerland. They could do two things: one was to sit and wait for a blow certain to come in smashing force at some place which we might select. The other was to seize the initiative at any cost, hit us where it suited them, and see what would happen. They chose the latter—an audacious move—probably because they were desperate.

Only desperation would have ignored the principle which this war has firmly established: heavy odds lie against any offensive attempted without control of the air. The Germans did not have control of the air. By our calculations, and they proved about right, the GAF's maximum potential was no more than 1,100 sorties on one day. On this basis, they did not have even air equality. We could match each one of those 1,100 planes with five or six. For the German break-through to be permanently successful, isolation of the battlefield was absolutely necessary. It was as certain as anything in war can be that the battlefield would be isolated —but not by the Germans. As soon as the impetus of the initial drive was spent, the Germans would find their supply lines wrecked, their reinforcements halted, their fuel and ammunition largely cut off—while the flow of our supplies and reinforcements would continue almost undisturbed.

This, of course, is exactly what happened.

The initial break-through was protected by a few days of bad weather. German meteorologists must have figured prominently in the planning of the German offensive. Because most European weather moves from west to east, their facilities for weather observation were probably not as extensive as they would have liked. Perhaps they predicted a longer spell of bad weather than actually occurred.

At any rate, the Germans made good use of their temporary advantage. By December 24 their spearheads were 50 miles into Belgium, almost to the vital line of the Meuse River. There the stiffening resistance of our ground forces—and, no doubt, the first effect of that self-limiting factor in any offensive—brought them up short. A critical moment was approaching. Could the Germans get their supplies and reinforcements smoothly and rapidly for a further push? They could not. The simple reason was that the weather cleared, and at once the Allies took to the air in enormously superior strength. With hundreds and hundreds of planes, they headed for the supply lines through which Marshal von Rundstedt's vital means for advancing, or even staying where he was, would have to move. From this moment, there was no let-up in the terrific plastering. We, and not the Germans, were isolating the battlefield.

After that period of bad weather from December 19 through December 22, tactical operations built up to a peak on December 24. That day the 9th Air Force, together with elements of the 8th Air Force which had joined the operations, flew 5,262 sorties. Throughout the period from December 16 to January 2, the tactical air blows were heavy and carefully aimed.

Altogether, more than 120 major marshalling yards, airfields, bridges, rail cuts, communications centers, and troop concentrations—from the central battle areas back to the Rhine River—were hit. Rundstedt's lines of supply to the salient were not merely interdicted at single points. Repair difficulties were heaped up by cutting the lines both forward and behind. The pattern for attack spread east of the Rhine to the communication centers which were essential to the movement of supplies from central Germany.

It is true, of course, that broken railroad lines and wrecked marshalling yards can be cleaned up and restored to use in what often seems a miraculously short time. But everybody knows what happens on one of our own railroads here at home when a few yards of track are torn up, a locomotive derailed and some box cars piled across the right-of-way. Trains are going to be delayed from one to ten hours. Imagine that line wrecked at half a dozen points, and wrecked again and again. Then you can guess how much of his time Marshal von Rundstedt must have spent pacing up and down, looking at his watch, while the vital trainloads of supplies waited helplessly on sidings a hundred miles away. Very often these supplies were not merely waiting; while they waited, they burned and exploded under direct attack of the tactical air forces.

We have good evidence that by January 1 this situation was more than the enemy could cope with. At German headquarters it must have been felt that something had to be done to check the galling attacks. Shortly after 0900 on New Year's, the Germans sent several hundred planes to attack 16 of our airfields in France, Belgium and Holland.

For the first time in months, the Germans made a large-scale air attack, but the damage was not severe enough to reduce our air effort.

In those days from December 16 to January 2, then, tactical air operations rounded out the principles demonstrated in Normandy. The Germans may make other thrusts elsewhere with forces and supplies massed for that purpose. Yet no such thrusts can be successful so long as we maintain air superiority. First-line German troops have experience—some of them six years of it—behind them. They are doing all that experienced and well-led troops can do, and we have every reason to respect them for toughness and resourcefulness. They will not fold up just because their first counter-attack failed. But this we do know: in the end they will fold up. There can be no final success in modern war for a military power that does not control the air. ☆

CROSS COUNTRY

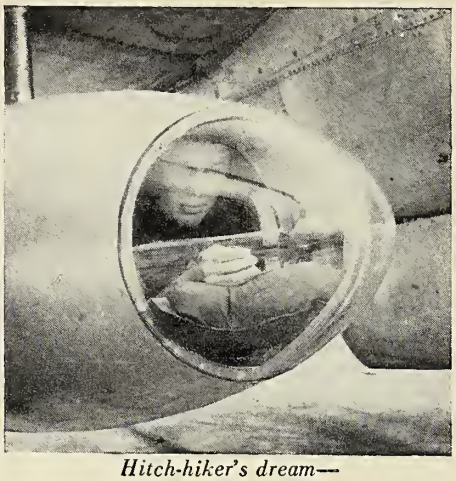
News and Views around the World

Mascots in the AAF—See Page 40

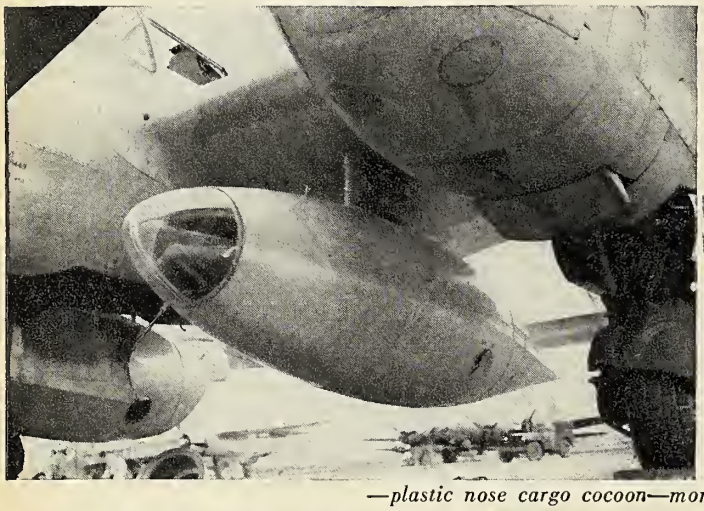
Cargo Cocoons

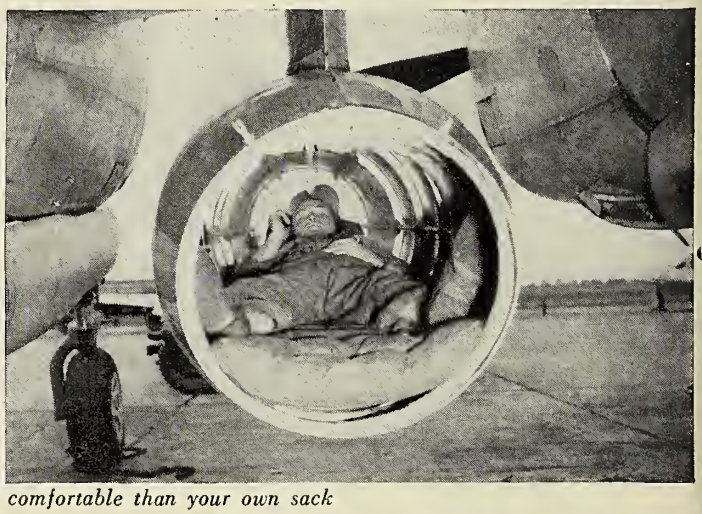
Fighter squadrons soon may be flying into advance bases with their own ground crews, comfortably lounging in cocoon-shaped auxiliary wing tanks, and enough supplies (except gasoline and oil) to fly operational missions for several weeks. In the Pacific and CBI, wounded men already have been carried to rear bases in make-shift modifications of ferry tanks. Beer, medicines and critical repair parts frequently have been stuffed into the tanks when transport planes were not available.

At Eglin Field's Proving Ground Command, all types of supply loads have been packed into 310-gallon capacity ferry tanks on P-38s to prove the reliability of carrying personnel and cargo under various flight conditions. Dummies were kicked out of the jettisonable tail cone at first to make sure a man could get out in an emergency. Then, Chief Warrant Officer George L. Singleton, a veteran of many jumps at Eglin, emerged from the wing tank cocoon at 7,000 feet and 170 mph indicated airspeed and easily parachuted to earth, demonstrating that a man could bail out without difficulty.



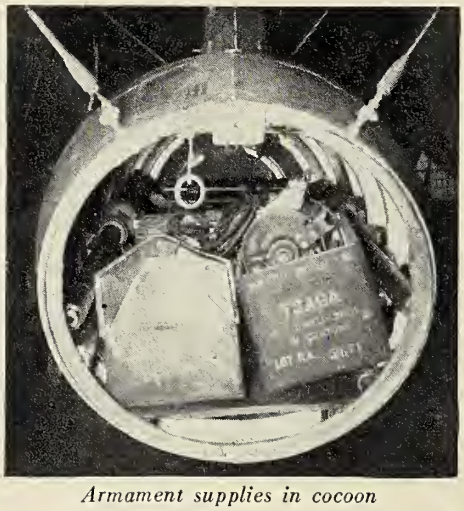
Hitch-hiker's dream—





—plastic nose cargo cocoon—more comfortable than your own sack

The cargo-carrying cocoon tank is a standard type but is modified by removing the innerlining, inserting a plexiglas nose and a jettisonable tail cone. It has an 1,800-pound capacity and two men can be carried comfortably, although it is big enough to transport three, somewhat crowded. An intercom system links the pilot with his passengers under each wing. Into each cocoon tank of a fighter can be packed enough mechanical supplies for minor repairs of a squadron for five days; enough ammunition for three and a half days, as well as four extra machine guns and enough rations for 24 men for three and a half days.



Armament supplies in cocoon

After Germany Falls

Concluding his second wartime report to the Secretary of War, General Arnold observed that the AAF operation in the Pacific after victory in Europe will be more than the simple matter of flying our men and planes from Europe to the Far East and promptly bringing Japan to her knees. Bombers can fly to the Far East, but fighter planes must go by boat, and that takes time. Planes must have modifications. New airbases closer to Tokyo must be built. Where possible, said the Commanding General, AAF men will be granted leave in the United States, but many and possibly most of them will have to go direct from Europe to the Pacific. Crews will have further training after they reach the Pacific.

Crash Fire Precautions

Recent findings by Office of Flying Safety medical officers show that between five and six percent of all persons receiving non-fatal injuries in airplane accidents are burned to some degree.

Although burns are a direct cause of death in only 2.3 percent of all fire-accident victims, a much larger percentage—75.4—are burned if fire occurs. In 50 selected cases where air crewmen received non-fatal crash burns, 45 were burned on the hands, face, or both. In only five cases were other parts of the body burned without the head and hands being involved. In 30, both head and hands were burned.

Obviously, uncovered faces and hands are most vulnerable to burns. Any sort of covering that can be utilized when fire is present or imminent lessens the danger of burns on these exposed areas.

Habitual use of light gloves, helmet and goggles provides valuable protective covering. Additional protection for the face may be gained by wearing an oxygen mask in case of fire or a crash landing.

Milk Run

The AAF has enriched the language with many new expressions and it is only natural that the home front cannot keep abreast of these additions to jargon and patter. Through the Atlantic City Redistribution Station recently came a pilot of the 15th Air Force. This young man carried a clipping from his hometown newspaper, a cherished memento of his overseas tour. It seems that after one particularly easy mission over Jugoslavia this pilot had said to his Public Relations Officer that "it was really a milk run," and the PRO sent this rather unstartling bit of intelligence to the flyer's hometown paper.

The following week the hometown sheet put this optimistic interpretation upon the message. Across the front page it read: LOCAL BOY BOMBS BALKAN DAIRY FARM.

Destroyer

Ensign Clarence A. Borley, Navy fighter pilot, shot down two Oscars and a Zeke while making a sweep over southern Formosa. A fourth Jap fighter pilot bailed out

as Borley's guns came within range. In a diving run over Takao his plane was shot down and the ensign bailed out into the sea. About an hour after he had hit the water, a small Japanese sailing dinghy set out from the shore to capture the American. But the shooting was not yet over. While they were searching for Borley, he drew his .38 caliber pistol from its holster and knocked one of the Japs out of the bow of the boat. The man fell overboard, presumably killed. The second Jap ran toward the front of the boat and Borley fired at him three times. On the third shot the Jap fell overboard capsizing the dinghy, and he too is presumed to have been killed. The pilot was later rescued by a U. S. vessel.

The Island-Hoppers

One of the oldest heavy bomber outfits in the Pacific, the 11th Group Island-Hoppers rounded out five years of service on the first of February. The group's combat path since Pearl Harbor crosses a map representing nearly half the globe, and today it is grinding down enemy resistance in the Bonin and Volcano islands, flying within 600 miles of Japan.

Many coral atolls ago this group was credited with the first offensive blow of the Pacific war when it struck Lunga airfield on Guadalcanal in July, 1942. Since then the group has moved steadily forward as a spearhead in the massive offensive that has rolled the Japanese back from 16,000,000 square miles of ocean into their own home waters. From all this has come the expression familiar to the 7th Air Force, "one damned island after another."

After suffering heavy losses in the Japanese attack on Pearl Harbor, the 11th Group salvaged what it could of its outmoded B-18s and the Flying Fortresses that had been acquired a few months earlier. The first task was looking for Jap submarines and aircraft carriers. The first blood was an enemy submarine, the first to be sent down in the Pacific by land-based bombers.

Built up to fighting strength by June, 1942, the B-17s ranged out 1,100 miles from the Hawaiian Islands to assist the Navy at Midway in beating off the Japanese task force that threatened to gain a foothold on the strategic island.

A few days later this group, which had been taken into the new 7th Air Force, bore down in a strike on Wake Island. Beginning their odyssey of the Pacific, the 11th was transferred in July to 13th Air Force in the Southwest Pacific. Taking their place in the plan for a combined operations drive northward against the Japheld islands, squadrons of the 11th were spread out over bases 600 miles apart near the Solomons. Each facing different problems, the squadrons had certain things in common: few airplanes, torrential rains, temperatures as high as 140 degrees, dengue fever, flies, a shortage of equipment, mud and tiresome food.

At the request of General Douglas MacArthur, the 11th left the fight around Guad-

QUESTIONS
on Policy and Procedure

Q. May Wacs be granted furloughs for periods in excess of 15 days to correspond to longer leaves and furloughs of husbands?
A. *Yes, if the exigencies of the service permit. Leaves and furloughs of Wacs married to men in the armed forces, so far as practicable, will be granted concurrently with leaves and furloughs of husbands. Leaves granted to WAC officers will not be in excess of the amount of accrued leave the officer has to her credit. (Sec. III, Cir. 17, WD, 1945.)*

Q. Are former enlisted men who were awarded the Good Conduct Medal during their enlistment authorized to wear the medal (or ribbon) after being commissioned?
A. *Yes, per informal decision of The Adjutant General, 7 August 1942.*

Q. Are temporary appointments as warrant officer, junior grade, suspended indefinitely or entirely eliminated?
A. *Neither. Sec. I, Cir. 375, WD, 1944, stated that "pending the receipt of revised AR 610-15, 15 September 1944, examinations for and appointments as temporary warrant officer, junior grade, under the provisions of AR 610-15, 27 February 1943, are suspended, effective immediately." AR 610-15, 15 September 1944, however, has now been issued and applies. With certain exceptions, listed in these regulations, the Commanding General, AAF, is the appointing authority for warrant officers, junior grade, to fill authorized vacancies within the units of activities under his control. Previously, the Commanding General, AAF, was authorized to delegate this authority to subordinate commanders.*

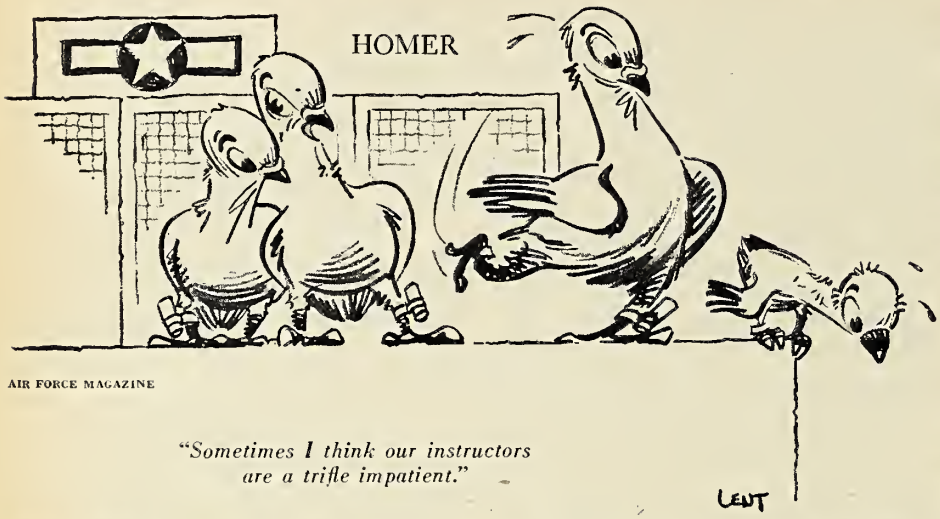
Q. May Army Air Forces pilots apply for Civil Aeronautics Administration pilot certificates and ratings?
A. *A recent amendment to the Civil Air Regulations provides for the issuance of CAA pilot certificate of appropriate grade and rating to individuals holding a currently effective pilot rating issued under the provisions of AR 95-60 while on active duty, provided application is made within the twelve-month period subsequent to being released. To such applicants on active duty, who are on flying status, the Civil Aeronautics Administration may issue either a Private Pilot Certificate or Commercial Pilot Certificate, depending on the qualifications of the applicant, provided the applicant submits a Certificate of Pilot Status and accomplishes successfully the 40-question multiple choice type examination on Civil Air Regulations. All questions are covered in parts 20 and 60 of the Civil Air Regulations. These parts may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C., at the cost of ten cents each. For further details, see AAF Ltr. 60-7, 18 January 1945, Subject: "Issuance of Civil Aeronautics Administration Pilot Certificates and Ratings."*

Q. Does a Reserve Officer relieved from active duty have to travel to his home of record to obtain mileage?
A. *Where a Reserve Officer established a home at a place other than his home of record at the time of assignment to active duty, and travels to the new home following his release from active duty, he may be paid mileage for travel actually performed to such place, not in excess of mileage computed on the distance to his home of record at time of assignment to active duty.*

Q. Some enlisted men are not applying for officer candidate school because they believe that their chances for return to a civilian status upon partial demobilization would thereby be impaired. Are such beliefs or impressions justified?
A. *No. The War Department states specifically that "eligibility for discharge or relief from active duty for both officers and enlisted men will be determined by military necessity and the Adjusted Service Rating Card."*

Q. Can graduates of Advanced Army Flying schools obtain Service Pilot's ratings upon obtaining the requisite experience in military aircraft or must the experience have been obtained in civilian aircraft?
A. *Flying time required to qualify for the rating of Service Pilot may be in either civilian or military aircraft. Time flown while undergoing a duly authorized course of pilot training in the AAF may be credited toward the flying time required. However, due to the large number of returnee combat pilots, additional Service Pilots are not needed, and additional ratings as Service Pilot are not being granted at the present time.*

PREPARED BY THE OFFICE OF THE AIR INSPECTOR



"Sometimes I think our instructors are a trifle impatient."

alcanal to strike at Rabaul from Port Moresby, New Guinea. It participated in the battle of Savo Island.

By the time the patched and battered 11th was recalled to Oahu to reorganize as a B-24 unit in March, 1943, most of the aircrews had flown 80 to 100 missions. One plane, the "Yokohama Express," was lost on its 114th mission. However, these missions were shorter than those the Group was to fly later in the Central Pacific. Changed over to Liberators, the group established bases in the Ellice Islands in November, 1943, and squadrons were organized at Funafuti, Nukufetau, and on Canton Island in the Phoenix group.

Crews of the 11th were first into action as the 7th AAF started its offensive against the Japs from its forward bases with a heavy strike against Tarawa from Funafuti on November 13.

Following close on the Tarawa invasion, the 11th plastered Jap bases in the Marshalls, hitting Mili, Jaluit, Maleelap, Wotje and Kwajalein. These were among the longest regularly scheduled heavy bomber missions of the war, many of them averaging 2,000 miles to a round trip. Crews spent from 10 to 15 hours in the air and averaged a mission every third day.

In February, Kwajalein and Eniwetok yielded to our amphibious forces and the 11th moved its bases forward again. For the first time since the island advance began all squadrons were together at one base. While continuing to keep the by-passed Marshalls neutralized, the 11th struck west to begin the neutralization of Truk, Ponape and other targets in what became the by-passed Carolines.

From bases in the Marshalls the 11th bombers struck at the Marianas; Guam, Saipan and Tinian came within the B-24 bombsights. In one strike against the Marianas, the 11th flew one of the longest shuttle bombing missions of the war. Turning away from their targets at Guam, the Liberators swung south across the Carolines to the American bases in the Admiralties and then returned with more bombs by way of Ponape. The mission totaled about 4,000 miles of over-water flying.

In October, 1944, the Liberator squadrons took off for the first time from the Marianas to begin bombing the heavily fortified enemy bases in the Bonin and Volcano Islands. Just in moving its bases the 11th Group has traveled 12,489 miles.

Something for the Girls

First Sgt. Darius King, recently returned from England, struck up an acquaintance with Sgt. Joseph Pry while visiting in Chicago.

"Sergeant King," Pry said, "I want you to come out to my house for dinner. I want you to meet my mother-in-law, my wife and my daughter." King accepted this offer of hospitality and went to Pry's house.

Throughout the afternoon the two sergeants exchanged overseas experiences, Pry having spent 26 months in the Mediterranean. About dinner time Pry told King and the womenfolks that he had a little surprise for them. He took a bundle out of his barracks bag and went to the kitchen. He was busy for 30 minutes preparing food and setting the table with fresh linen and the best silverware. When Pry invited them to dinner—there on the table was a complete meal of C-rations: beef hash, meat and beans, vegetable stew, hard tack and powdered coffee.

"I been eatin' these items for two years," Pry told his family with some emotion. "I want you folks to eat them just once."

CAP Completes Tow Job

One of the least known missions of the war will be concluded on the first of March with the closing of Civil Air Patrol's tow target operations, it has been announced by Col. Earle L. Johnson, the National Commander. All other activities of the 48-State CAP organization will continue as usual.

The tow target work was one of the jobs that CAP, as an auxiliary of the AAF, set up at a time of critical need to relieve Army planes and airmen for combat duty.

Now the AAF is prepared to take over.

The towing of sleeve targets over the fire of antiaircraft guns, the flying of "tracking" missions for aiming practice, and maneuvering at night over the blinding glare of searchlights are missions which call for a high degree of skill, often against serious hazards.

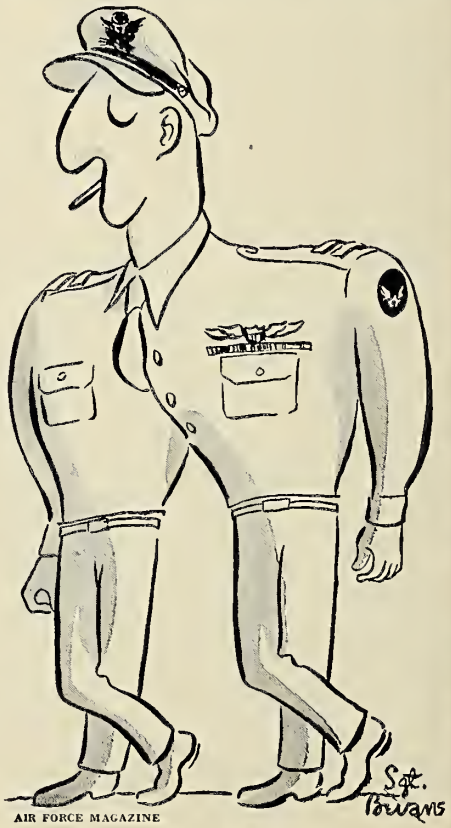
"In this work," said Brig. Gen. W. W. Welsh, Assistant Chief of Air Staff, Training, "CAP's volunteers have made a notable contribution to the training of antiaircraft gun and searchlight crews. This training is essential not only for the defense of our coastal areas but for the sending out of skilled crews to protect airfields and other military installations in the zones of combat.

"All reports from the Army units for which the work has been done are highly commendatory. Performance has met the standards of the AAF itself. It is a job well done."

CAP, founded a week before Pearl Harbor, undertook the towing of aerial gunnery targets as one of its first volunteer missions. Early in 1942, pilots of the Illinois Wing, at their own expense, towed targets over the fire of the guns of Fort Sheridan. This is believed to have been the first time that civilian planes were used for such work.

Toward the end of 1942, regular tracking missions for aiming practice began on the Eastern Seaboard. A year later, several special CAP tow target and tracking bases were set up in the Eastern and Western Defense Commands and were completely manned by CAP members who brought their own planes and equipment. These operations, at their height, employed about 300 men, most of whom were over-age or were otherwise disqualified for combat.

In the CAP tow target and tracking work, over 19,000 missions totalling more than 44,000 airplane-hours were flown.



P-38 PILOT

There were 7 members killed, 5 seriously injured, and 19 CAP planes lost in this work.

Income Tax

The Legal Assistance Division of the Air Judge Advocate's Office advises that conversations with returnees and letters from personnel overseas have pointed up a need for further emphasis on the status of military personnel with respect to their liability under the federal income tax laws. It is strongly recommended that those who did not happen to read "The Hard Facts about Income Tax" in our October issue secure a copy of that issue and see for themselves how the income tax law affects them.

There is quite a difference between personnel serving overseas and those within the continental United States as far as their income tax obligations are concerned. It is definitely unwise for a man overseas to pay any income tax or allow his wife or someone else to file and pay his income taxes for him during his period of overseas service. The man overseas should wait until the 15th day of the 4th month following the month in which he returns to the continental United States before filing returns and making the payments which have accumulated while he was away. Meantime, however, it is a good idea to set aside the approximate amount of tax which is accumulating, so that actual payment will not be too much of a blow financially.

Men serving within the continental United States are subject to the same rules as to the time for filing returns and paying taxes as are civilians, except that if such personnel can show affirmatively that their military service has affected their ability to pay the tax they may request a deferment from their collector of internal revenue. Even if the collector grants a deferment, men within the continental United States must still file declarations of estimated tax and final returns on or before the dates they fall due. Remember, this deferment is not automatic, but must be applied for and granted before it is effective. Men who have returned from overseas can, of course, likewise apply for such a deferment.

It is a safe rule for the wife of a serviceman serving overseas, who is working or has other income of her own, not to claim her husband's surtax exemption on her return or on the form filed with her employer for withholding purposes unless she is absolutely sure that her husband will owe no tax, in which case she should claim her husband's surtax exemption. In filing any return, she should ignore any income of her husband who is overseas and base her return solely on her own income.

If you are overseas, plan to see a Legal Assistance Officer as soon as possible after your return to the continental United States. He'll be glad to give you the assistanee you'll need.

Conversation

Lt. Jesse C. Simonds of Rochester, N. H., had just stepped from his plane at a Russian base after a shuttle bombing raid. A

PLANE BONERS

Analyzed by Veteran Pilots

WAYCROSS, GA.—As a P-40 pilot ran up the engine prior to take-off, the plane began to move forward. He applied the brakes to stop the roll but he did not retard the throttle. Consequently, the pull of the prop against the brakes nosed the plane over.

Comment: When an irresistible force tangles with an immovable object, something's bound to happen. Most pilots realize that power and brakes are each other's antithesis—one being used to cause motion and the other to prevent it —and that both are not to be applied simultaneously.

ENGLAND—Returning from a combat mission, a P-47 pilot landed his plane normally and then pulled over to the side of the runway so that he could have a clear view of the plane ahead of him. The Thunderbolt's right wheel slipped from the edge of the strip and dug into the mud, causing the plane to turn turtle.

Comment: Simply a case of pilot error. Shoulders are usually soft and hazardous, and flyers have been warned time and again to keep their planes on the runway.

MCCHORD FIELD, WASH.—The wings of a B-25H buckled when the pilot executed a pull-out too sharply after attaining a speed of 250 mph in diving from 7,000 feet.

Comment: Evidently forgetting that B-25Hs have control boosters, the pilot overcontrolled when he pulled out of the dive. In the overly sharp pull-out, the designed load limit of the plane was exceeded.

AVON PARK, FLA.—The electrical operation for lowering the landing gear of a B-17 had been completed, and the pilot directed the engineer to make a visual inspection of the gear. The engineer reported all wheels were down and locked. After the Fortress had been landed, it could not be turned off the runway. Examination revealed that the plane had been brought in with its tailwheel retracted and that the tail section had been damaged beyond repair.

Comment: Investigation disclosed a blown-out fuze in the tailwheel retracting motor. Thus the wheel could not be lowered electrically. When questioned, the engineer admitted he had checked only the main gear. He was ordered tried by a summary courtmartial on a charge of negligence.

FRANCE—Ten minutes after taking off, a UC-78 pilot was forced to crashland when both engines conked out. He was injured only slightly but the transport was washed out completely.

Comment: Although this pilot had many hours of training and operational flying to his credit, he disregarded one of his most basic responsibilites by takng off without having his engines serviced.

OKLAHOMA CITY, OKLA.—After a normal approach, an F-5E landed nosewheel first. The wheel collapsed backward and the plane skidded to a stop. The pilot was uninjured but the plane was damaged extensively.

Comment: The attitude of the plane definitely was wrong for landing on a tricycle gear. A nosewheel is not intended to withstand the full initial landing shock. Therefore, the nose must be held high enough to permit the plane first to rest on its main gear and later to settle slowly on the nosewheel.

ENGLAND—Trying to save time, a B-17 pilot ran through his checklist from memory and then took off. As the bomber became airborne, the pilot sensed something was wrong. He cut the switches in an attempt to land but his right wing struck the brick wall of a transformer station, broke off and burned. The crew escaped but the Fortress was a total wreck.

Comment: Investigation revealed that the pilot in checking without consulting his list had overlooked the aileron control and consequently was unaware that it was locked. Correct procedure should never be sacrificed to gain a few minutes.

ITALY—Flying with a full combat load, the pilot of a P-47D attempted to make a tight, 360-degree turn to 500 feet in order to join a formation quickly. The plane stalled, flipped over on its back and dived into the ground. The pilot was killed and the Thunderbolt was wrecked completely.

Comment: A steep, tight turn with a heavy load is always foolhardy. If a pilot must risk high-speed stalls, he should be certain there is plenty of space under him for recovery.

TALLAHASSEE, FLA.—The pilot of a P-40N made a normal night landing and then taxied to the clearly-lighted end of the runway. There he attempted an abrupt, sharp left turn onto a taxi strip. When he jammed on the left brake, however, the plane nosed up. The engine and propeller were wrecked completely.

Comment: A pilot must tread lightly while taxiing. A heavy foot on a plane's brake has led more than one flyer into trouble.

PREPARED BY THE OFFICE OF FLYING SAFETY.

NEW BOOKS

On Aviation Subjects

AT WAR

FIGHTERS UP. *Eric Friedheim* and *Samuel W. Taylor.* An account of combat experiences and between-mission activities of fighter pilots of the 8th and 9th Air Forces. Sale benefits AAF Aid Society. MACRAE-SMITH, PHILADELPHIA.

OUR FLYING NAVY. Concise history of naval aviation, with color illustrations by 7 American artists. MACMILLAN, N. Y.

PILOTS ALL. *Henry Felson.* A story of pilot training and personal combat incidents. HARPERS, N. Y.

TECHNICAL

AIR NAVICATION, Part Seven, Nautical Astronomy and Celestial Navigation. Another in the series of air navigation texts prepared under the supervision of the Aviation Training Division, U. S. Navy. MC CRAW-HILL, N. Y.

AIRFRAME MATERIALS. *F. S. Stewart.* A description of processes by which lightweight materials are assembled for airframe construction. MC CRAW-HILL, N. Y.

COMFORTIZATION OF AIRCRAFT. *A. A. Arnhym.* Discusses light, air, heat, and flight comfort. PITMAN, N. Y.

METEOROLOGY, a Practical Course in Weather. *G. J. Brands.* Fundamentals and modern developments in synoptic meteorology. MC GRAW-HILL, N. Y.

PARACHUTE TECHNICIAN. *C. A. Zweng.* Manual of instruction for the parachute worker. PAN-AMERICAN NAVICATION SERVICE, NORTH HOLLYWOOD, CALIF.

PIONEERING THE HELICOPTER. *C. L. Morris.* History and potentialities of rotary aircraft. MC GRAW-HILL, N. Y.

QUESTIONS AND ANSWERS FOR AIRPLANE AND ENGINE MECHANICS. Aviation Research Associates. Compilation of practical and theoretical knowledge for aviation mechanics. MC GRAW-HILL, N. Y.

THE MODERN GAS TURBINE. *R. T. Sawyer.* Study of the gas turbine, including its application as a supercharger and its use in jet propulsion. PRENTICE-HALL, 1945.

YEARBOOKS AND HANDBOOKS

AVIATION ANNUAL OF 1945. *R. M. Cleveland* and *F. P. Graham.* New issue of a yearbook covering all phases of aviation. DOUBLEDAY, DORAN, N. Y.

HANDBOOK TO ARMY RECULATIONS AND OTHER DIRECTIVES ON ADMINISTRATION. *Walter Sczudlo.* A reference book, arranged alphabetically by principal subjects. MILITARY SERVICE PUBLISHINC CO., HARRISBURC, PA.

THE AERONAUTICAL DICTIONARY. *T. A. Dickinson.* The latest compilation of aviation terminology with definitions and illustrations. CROWELL, N. Y.

THE AIRCRAFT MANUAL, 1945. *David C. Cooke.* Recent developments in military and civilian aircraft. MC BRIDE, N. Y.

These books are available to AAF personnel through the AAF Field Technical Library Service, which provides for technical libraries at all major institutions. List compiled by the AAF headquarters library.

friendly group of civilians crowded around to salute the crew, and a young Cossack girl ran up to Simonds, navigator, choosing him as her personal hero. "How many Germans have you killed?" she asked eagerly. The navigator, reminded that this was his first mission, was embarrassed at the girl's enthusiasm. This wasn't helped by the kidding remarks thrown at him from his crew. "Go on, tell the little girl," the copilot urged.

"Please do," the girl added. "I will tell you first. As a sharpshooter I have killed 20 today. You must have killed many more. How many have you killed?"

Pilots' Examinations

A recent AAF letter, concerning the examination of pilots and flying regulations, directs that all individuals except command pilots, senior pilots, senior service pilots, pilots holding a currently effective instrument pilot's certificate, AAF Form 8A (Green), and civilian pilots of army contract cargo aircraft who pilot AAF aircraft will be examined at six months' intervals. All pilots, with these exceptions, upon permanent change of station, will be examined at the new station before being permitted to make other than local flights.

Command pilots, senior pilots, senior service pilots, and pilots holding a currently effective instrument pilot's certificate, AAF Form 8A (Green) will be examined at the discretion of the commanders concerned. Pilots returned from combat will not be examined at Redistribution Centers.

They Call Her 'Uncle'

The control tower call symbol UJ61, or in pilot language "Uncle Jig Six one," suddenly became "Aunt Jane six one" when WAC Pvt. Elsa Mood took over the tower microphone at the Midland (Texas) Army Air Field. But the authorities couldn't agree that the advent of a soprano was any reason for a change in the phonetic system so Elsa is "Uncle Jig" to Midland flyers.

Paging Lieutenant Brown

From Maj. Herbert Johansen, our correspondent in the Philippines, comes an account of the unusual experience of an AAF fighter pilot, a lieutenant named Brown.

Forced down in the ocean off New Guinea after an encounter with the enemy, the pilot reached shore about dusk. He buried his Mae West in the sand and concealed himself in the thicket, for he knew he was in Jap-held territory.

Next morning, the pilot heard sounds of beating in the brush and several voices shouting: "Lieutenant Brown, Lieutenant Brown . . ." Certain the voices were not American or Australian and suspicious of a Jap trick, he remained hidden. He couldn't figure out, though, how anyone could know his name or that he was in that area, for he was pretty sure no other flyer, friendly or enemy, had seen him go down.

When later in the day, however, his name was called again, curiosity got the better of him and he emerged to find New Guinea natives were doing the yelling. Addressing the bushmen, he found they knew no English. They responded only by repeating his name and beckoning him to follow them.

Deciding to take a chance, he accompanied the group to a small village. There a bushman, who had learned English at a missionary school, explained that after finding the Mae West with "Lt. Brown" stencilled on it, he had taught the others how to shout the name and had then dispatched them as searchers in all directions.

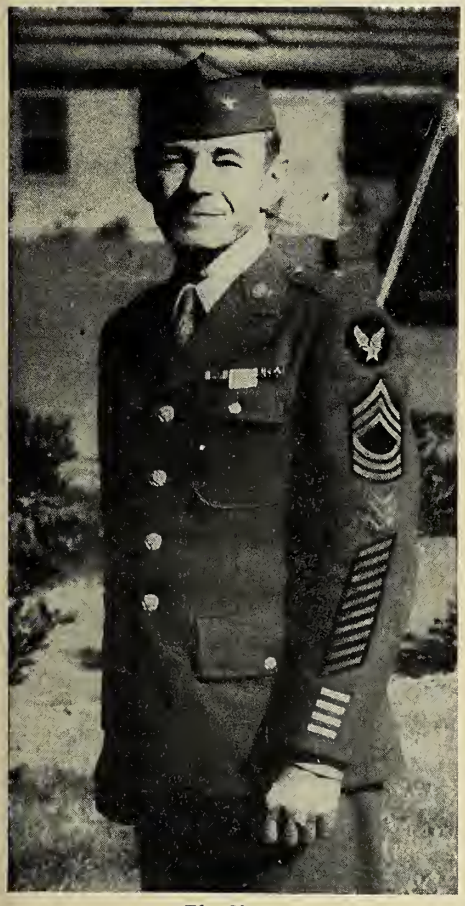
A short time later, Lieutenant Brown was back at an Allied base, a great believer in missionary work.

Tail Gunner, 53

M/Sgt. Michael Jamrack, 53 years old, 31 years in the Army, is a little unhappy at being kicked out of the service, just when the chow is getting good. Mike, sometimes known as The Sleeve (he has 26 stripes and

So they said "Uncle"

chevrons of various kinds and colors between shoulder and wrist), spent World War I as a machine gunner in the infantry. In this war he completed a tour of missions as tail-gunner in a B-25 squadron in Africa. Now back in California, being crowded out of the Army due to his age, Mike says: "I hope my discharge takes all winter to come through. In all my time in the Army I've never seen such good food." When the discharge comes through Mike is going back to his home town of Lup City, Neb.



The Sleeve

Responsibility

General Arnold's recent letter on the subject of "Continuing Responsibility of ALL AAF Personnel," is reprinted here to give additional circulation to the commanding general's attitude on a matter of growing importance in the Air Forces:

1. I want to impress on all officers and men of the Army Air Forces, both those who have returned from overseas and those who have not had the opportunity for service in an active theater, the urgent necessity for hard and continuous work. The resources of our country are not unlimited; and we must each of us devote ourselves unstintingly to our duty wherever assigned.

2. Those who have experienced the rigors of combat service must adapt themselves to frequently less stimulating duties in the United States. This is acknowledged to be difficult; none the less it can and must be done whole-heartedly.

3. There remain in the United States many thousands of highly qualified officers and men who have not yet had the opportunity for combat service. It is my intention that these officers and men shall have service in an active theater. To accomplish this objective will require their replacement by personnel returned from overseas. I shall expect commanders of all echelons to insure expeditious action to attain this objective.

4. Within the framework of the continental commands you must place combat experienced personnel in positions commensurate with their grade and ability. These officers and men have demonstrated in combat the highest soldierly qualities. They deserve and are entitled to continue giving devoted service. Temporary maladjustments, due to nervous and physical strain over an extended period of time, must be recognized and handled with a high degree of leadership. Where retraining is necessary, you will see to it that no time is lost in accomplishing such training.

5. Good discipline is essential to the military establishment. Good discipline includes acceptance and top performance of assigned duties regardless of personal desires. Commanders, combat experienced personnel, and those not yet having overseas service must all remember this fact. The commander must remember that he is commanding men; the men must remember that they are men; it is a mutual responsibility.

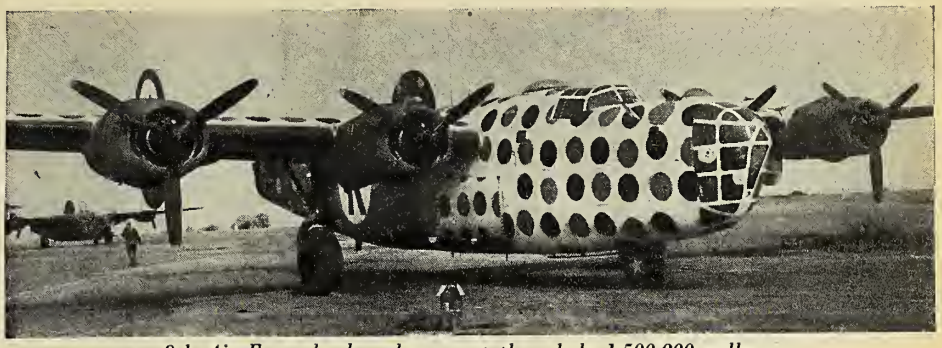
6. It will probably be inevitable that physically and professionally qualified officers and men will be assigned to more than one combat tour. It is, therefore, imperative that where practicable no effort be spared to provide one combat tour for all qualified before the inexorable demands of war require the return of the combat veteran to an active theater.

7. I shall give this matter my continuing attention; and it will be the subject of inspection and inquiry by senior staff officers of this Headquarters during field visits.

Reverse Lend-Lease

During the first six months of 1944, during the aerial build-up to D-day, English industry supplied 425,000 ship-tons of critically needed items that helped make possible the constant pounding of Occupied Europe.

To keep U. S. Air Service Command repair depots operating at peak efficiency, the British supplied more than 2,500,000 separate items of engineering and shop equipment, according to Brig. Gen. Junius H. Houghton, director of supply for the Air Service Command in Europe. In addition, American planes are flying with more than 50,000,000 British rivets in their bodies and are covered with almost 1,500,000 gallons of British paint, dopes and varnishes.



8th Air Force leader plane—not the whole 1,500,000 gallons

Other figures include: well over 1,000,000 British spark plugs, used in P-51 fighters alone; almost 400,000 auxiliary fuel tanks, vital to long range fighter aircraft; about 30,000 suits of body armor to protect American airmen from German flak, and almost 5,000,000 feet of fabrics, ropes and cords used in aircraft repair.

To improve the accuracy of U. S. aerial gunners, the British in the past year provided more than 6,000,000 clay pigeons and 4,500,000 shotgun shells for target practice.

Closest Coordination

Cooperating with a Chinese drive on Lungling, pilots of "Flying Horse" Fighter Group dropped a bomb squarely on a heavily fortified Jap gun emplacement while the advancing Chinese hugged the ground but 25 yards away. After this action the Chinese inched forward with identifying panels on their backs to mark their positions. The planes then swooped down repeatedly to strafe a matter of yards in front of the troops. This combined land and aerial attack proved too much for the Japanese who had originally intended to make a stand to the last man. They broke and ran in an attempt to escape the planes and infantrymen. When the pilots returned to their advanced base they found a commendation awaiting them from the commanding general. The enemy position had been taken and not one Chinese soldier had been injured during the extremely close aerial coordination.

Miracle Man

Lt. Wallace C. Montague, 20-year-old veteran of more than 100 missions in the Southwest Pacific, is known among fellow pilots as "the man who forgot to die." Lieutenant Montague, of Baltimore, survived a 1,300 feet parachuteless fall into the ocean and survived.

Montague said he had been forced to bail out of his plane when his engine exploded. "The whole plane was in flames," he said. "I pulled the ripcord and the chute failed

TRAINING AIDS

Newly Standardized for Field Use

FILMS

REMOVAL OF BATTLE CASUALTIES FROM AIRCRAFT (TF 1-3355)—Shows correct methods of removing air combat casualties from various aircraft, using standard, semi-rigid and improvised litters. Running time: 14 minutes.

B-17F ENGINE REMOVAL (TF 1-3728)—Formerly listed as AF-185. Routine engine change on No. 2 engine, including step-by-step stripping of engine. Running time: 17 minutes.

B-17F ENGINE BUILD-UP (TF 1-3729)—Formerly listed as AF-186. Detailed step-by-step procedures for preparing new engine for mounting on plane. Running time: 22 minutes.

THE REMOTE INDICATING COMPASS (TF 1-3722)—Operation, testing, installation and compensation of compass. For personnel in depots and sub-depots. Running time: 30 minutes.

NAVIGATION GROUND MISSION, PARTS I AND II (TF 1-3431)—For navigator's schools only. Simple photographic coverage, without sound track, of navigation problem. Running times: Part I, 55 minutes; Part II, 50 minutes.

PUBLICATIONS

PRECIPITATION STATIC (AF Manual No. 40)—Down-to-earth information on what this atmospheric phenomenon is and how to defeat it.

SHOOT THE BULL (AF Manual No. 1, revised)—Fixed gunnery testing aid for study of range estimation, angle-off estimation and deflection allowance by fighter pilots.

AIDS FOR NAVIGATORS AND BOMBARDIERS (AF Manual No. 41)—Suggestions for improving target and terrain identification.

NEW PUBLICATIONS CATALOG—Lists more than 200 titles of training publications available for AAF use.

FIRST AID IN FLIGHT (AF Manual No. 45)—Compact, simplified briefing on life-saving during flight. Is to be part of "Kit, First Aid, Aeronautic," found in both Army and Navy planes.

INSTRUCTOR'S MANUAL FOR PHYSICAL RETRAINING (AF Manual No. 24)—Common causes of military disability and techniques of physical therapy most suitable for each. For physical instructors in convalescent training program.

SIT DOWN AND PLAY (AF Manual No. 29, Book 1)—A handbook of elementary piano playing for the convalescent soldier. Obtainable through Air Surgeon's Office.

GRAPHICS

"ONE MAN LIFE RAFT" and "EMERGENCY SUSTENANCE KIT, INDIVIDUAL BAIL OUT RATIONS"—Although not the latest of their kind, these two single posters will be found valuable while new posters showing later models of similar emergency equipment are being developed.

MAKE AND PLAY YOUR OWN MUSICAL INSTRUMENT—Poster series comprising complete plans for building the "Xylette," miniature piano to be used with music instruction handbook, "Sit Down and Play" (AF Manual No. 29, Book 1). Obtainable through Air Surgeon's Office.

A-26 DITCHING POSTER—Illustrates four major phases of ditching, namely, flight positions, ditching attitude, braced positions and exit procedure, and gives specific directions for those crew members concerned in each phase.

RECOGNITION

RECOGNITION OF AIRCRAFT IN SEARCHLIGHT BEAMS (Aircraft Slide Supplement No. 9)—Now being distributed to using activities in accordance with requirements received from all Air Forces and Command headquarters, both domestic and overseas.

Information on the availability of training aids listed in this column, unless otherwise indicated, may be obtained from the chief, Training Aids Division, Army Air Forces, One Park Avenue, New York 16, N. Y., upon request through channels.

to open. I made a free fall of 1300 feet and landed feet first in the water. I went under about 30 or 40 feet, then began struggling toward the surface. I pulled my cords to inflate my life vest, then passed out."

About five minutes later a Navy motorboat picked up the pilot, gave him a dose of morphine and took him ashore. Examinations showed that Montague's left lung had collapsed, but doctors predicted it would return to normal. Other than this he suffered only a twisted ankle and a few bruised muscles.

Getting Tough

The 4th Air Force has inaugurated a course at Camp Pinedale, near Fresno, Calif., designed to refresh officers in all phases of administration and the handling of troops, with strong emphasis on their conditioning and physical improvement.

The schedule calls for more than 300 hours of schooling a month and operates on a seven-day week. In addition to the usual classroom subjects, there is a two-day field compass problem, 100 miles of hiking, training in hand-to-hand fighting, bayonet drill, a sham battle, swimming and water safety, pole climbing, wire laying, and practice in digging foxholes and slit trenches.

These outdoor activities, combined with a two weeks' bivouac in the mountains, have been the means of graduating many officers much better fit for field duty than they were before the hardening process began. The program, now being enlarged, is under direction of Maj. G. V. Underwood.

Odds: 100 to One

Can a single Superfortress defend itself against persistent fighter attacks? Is an airplane the size of a B-29 maneuverable enough to take good evasive action? In heavy bombers, a lone plane is duck soup—doesn't the same situation apply to the very heavies—only more so?

For some remarkable answers to these questions, trace the flight of a China-based B-29 which went on a photographic mission over Japan. The Superfort was so new that a name had not yet replaced its number; its pilot had never been under fighter attack before. The two previous reconnaissance flights by other B-29s had ended in crack-ups in which 11 men were killed.

Superfortress #582—the nameless one—ran into bad weather, and a thick overcast at 5,000 obscured the indicated target area. Some pictures were made of a target of opportunity—which turned out to be an important dyestuffs plant—and the B-29 turned for home. It was a routine mission.

But the Japs weren't passing up the opportunity of getting in a couple of licks at an unaccompanied B-29. Cpl. William L. Douglas, tail gunner, called off the first ones. "Nine fighters at six o'clock. Coming in fast."

A formation of Tonys and Zekes drew abreast and then raced pass the Superfort. Maj. Charles Eiggerman, the pilot, nosed down his plane to gain speed. The fighters came in from one o'clock and Eiggerman

turned into the attack. The forward turret gunner opened with his four 50s and a Tony dropped off and went down in smoke. Eiggerman kept pushing head-on into the attacks, refusing to make a straight and level run for it, thereby giving the Japs an easier target. The Japs were flustered; they split up, unable to improvise against a Superfortress doing the head-on flying.

A Tony made a pass from nine o'clock low and Sgt. David Sagoy, left blister gunner, nailed it with a couple of bursts. Three more approached from eleven o'clock level. Eiggerman nursed the plane around into the attack and the forward turret gunner disintegrated a Zero at 200 yards dead ahead. The six remaining fighters pulled away, apparently short of gas, but 15 more climbed to continue the assault.

The new fighters made individual attacks from every position on the clock. Whenever possible, the B-29 turned into them, bringing the combined power of its six forwardshooting 50s to bear on the enemy. On the majority of attacks, the B-29 fired first.

Fifteen Jap fighters converged on the B-29 like so many vultures pecking at a carcass. Two pulled ahead and waited to make coordinated attacks from either side; Eiggerman throttled back and threw off their timing. The tail gunner called two more screaming up from six o'clock low; Eiggerman jammed on the power, varying his speed as much as 50 mph. A single Zero climbed to rake the bottom; Eiggerman nosed up. A Tony barrelled in from seven o'clock; Eiggerman nosed down, changing his altitude by as much as 1,000 feet. Nothing violent. Nothing too sudden. A slight, gentle turn was enough.

Suddenly, the Japs turned and left. After a running fight for an hour and a half, they were obviously short on gas. With the skies cleared, the crew relaxed. Gunners checked their ammunition. The navigator brought his log up to date. The heavy flak suits were taken off. Somebody broke out thermos jugs full of fruit juice. The attack was over.

Then the tail gunner called over the interphone. He said calmly, "There are about 75 to 100 Japs climbing fast from 4,000 feet below us."

Eiggerman, just as calm, asked, "What did you say?"

Douglas repeated and allowed that maybe he had overestimated. "There might not be more than 70," he said.

Seventy Japs against a lone Superfort. Against a Superfort already low in ammunition. Against a very tired crew.

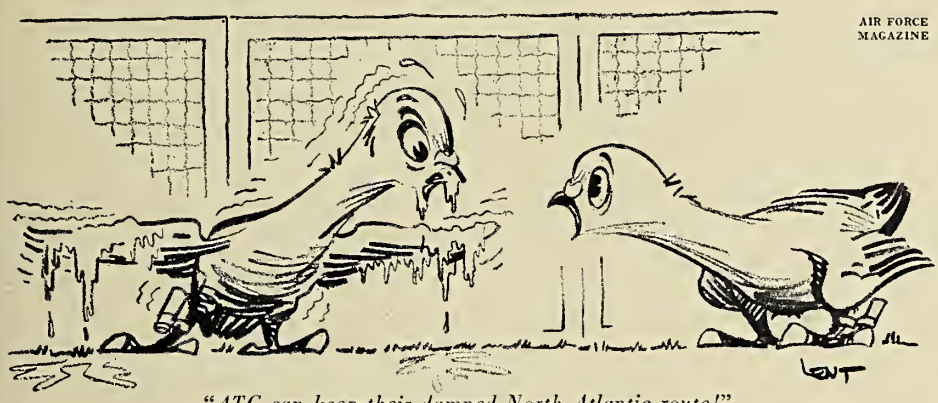
The Japs peeled off in line astern, and kept coming. Eiggerman had the light touch of a fighter pilot as he maneuvered his more than 40-ton airplane. He pushed up the nose, and then turned it down, almost with the same movement. He went to the right to meet an attack, then carefully swung around to head into a fast pass from the left.

Crewmen used up their small ammunition supply grudgingly. Some Japs hung back and fired from maximum range; others closed in, trying to get point blank shots. There were so many of the enemy that they got in each other's way.

The attack continued for 35 minutes. Eiggerman realized that he had only enough gas to fly straight home—he could not use up any more fuel in taking evasive action. As he throttled back to thin the mixture, the tail gunner called, "The Japs are leaving. It's all over."

The nameless one had defended itself against persistent enemy attack, lasting a total of more than two hours. About 94 enemy fighters had risen to intercept the lone B-29. Yet *not a single bullet had touched the Superfortress.* There was no battle damage. No American had been hurt.

HOMER



"ATC can keep their damned North Atlantic route!"

Parachutes

LOST

No. 41-40252, B-7 type; return to the 78th AAF Supply Officer, Selman Field, Monroe, La.

No. 42-147974, seat type; return to AAF-391-SO, Army Air Base, Abilene, Texas.

Nos. 42-22-784, 42-416564, 42-333200, 42-467367, 42-264018, 42-781235, 42-220847, 42-85226, all seat type; return to 320th Troop Carrier Squadron, Wendover Field, Utah.

Nos. 42-239727, 42-285076, 42-371246, all seat type; return to Commanding Officer, Merced Army Air Field, Merced, Calif.

No. 42-389533, seat type; return to Post Operations Officer, Midland Army Air Field, Midland, Texas.

Nos. 42-785425, 42-426590, 42-296019, 42-316443, 42-785684, 42-786118, 42-277629, seat types; return to Parachute Department, Ellington Field, Texas.

Nos. 42-230985, 42-297823, both QAC type; 42-450631, S-1 type; return to 11th Tactical Reconnaissance Squadron, Lafayette Army Air Field, Lafayette, La.

Nos. 42-392642, 42-420580, 42-447989, 42-453553, 42-672851, 42-275567, 42-1036946, return to Base Operations Office, Alliance Army Air Field, Alliance, Neb.

Nos. 42-426446, seat type; 43-54314, QAC type; return to Headquarters, AAF Western Flying Training Command, Orange County Army Air Field, Santa Ana, Calif. Attn: Maj. John P. Couch, Airdrome Director.

No. 42-466169, type S-1; return to Dale Mabry Field, Tallahassee, Fla. Attn: Maj. Paul B. Gambonini, Operations Officer.

Nos. 42-461771, 42-221925, 42-660059, 42-659864, 42-694344, 42-659860, 42-659852, 42-123169; return to Base Operations' Parachute Pool, Malden Army Air Field, Malden, Mo.

No. 42-5968; return to Cochran Field, Macon, Ga. Attn: Operations Officer.

FOUND

No. 42-204671, seat type; held by Coffeyville Army Air Field, Coffeyville, Kan.

Correction

In the article "Shock Waves at 600MPH" in the February AIR FORCE, the omission of six words from a sentence resulted in an erroneous explanation of the effect of shock waves on aircraft stability. As published, the third paragraph on Page 31 of that issue implied that formation of a shock wave on the wing shifted a plane's center of gravity. This, of course, is impossible since the CG can be changed only by shift of weight within the plane itself. We quote below the corrected paragraph with the six missing words italicized:

"With the formation of a shock wave on the wing, the lift on the wing will be greatly decreased. This will affect the stability of the plane *in the same manner as shifting* the CG to a far-forward position, make pull-outs difficult."

HOW SHARP ARE YOU?

QUESTIONS

1. What plane is shown in the picture?
2. How many guns are visible?
3. How many crossbars are there on stand at left?
4. Where is the helmet of the man bending over the engine?
5. Where is a canteen shown?
6. Which man is wearing a watch?
7. Are both men wearing first aid pouches?
8. How many cannon cleaning rods are shown?
9. Which man has his sleeves rolled up?
10. On which stand is an oil can?

ANSWERS ON PAGE 60

Banzai at Burauen

(Continued from Page 7)

for reasons of safety. It was a new kind of war for an air force general but "Whitey" as the tank boys were calling him within a few minutes, took to it like a duck to water.

He squeezed into the telephone compartment of a half track, inspected the defense lines, snapped orders to headquarters over a direct line strung under fire by tank communications men. When it was all over, Major Daniels paid General Whitehead the highest compliment he knew. He said, "The General would make a damned fine tank commander."

More infantry and artillery were brought in. Parties combed the hills beyond Burauen, annihilating Japs by the score. Reports came in every hour; 26 Japs killed a mile to the north, a hundred bottled up in a cave to the west with an airborne company waiting grimly and patiently for them to come out. Straggling Jap infantry and paratroopers were being thoroughly and systematically wiped out to the east and west, to the north and south.

The few prisoners taken revealed the paratroopers were fanatics, volunteers for a suicide mission the nature of which was not specified when they joined. They had been in Formosa, were flown to Manila the day before the attack. They were excellently equipped, a typical paratrooper carrying an 8 mm tommy gun of a new type, an 8 mm pistol, 8 M-97 grenades, 2 smoke candles, a bayonet, a case with tommy gun clips, a case containing two Molotov cocktails, one magnetic mine and case with spare parts, a parachute, a set of waterproof clothing, pieces of rope, a sack of rations, a canteen. Some carried radios, demolition equipment of new and unusual types, folding-type rifles.

Seven of the dead were found to have either American military or civilian clothes under their uniforms.

The 5th Air Force had come through three enemy attacks, in five days. Weary, battle scarred, hurt, it sat back, licked its wounds. Headquarters men, signal men, ordnance men . . . men of the statistical unit, the special service unit, the air force band . . . men who had long since decided they would never see direct combat with the enemy had suddenly been called upon to fight. They fought well, well enough to stop a fanatical enemy; well enough to take a new pride in their "non-combatant" organization.

The trophy is already available, a Jap battle flag and two Jap rifles, presented by the doughboys of the beloved infantry company. The flags and rifles were mounted on a board bearing the 5th Air Force shoulder patch in one corner and the doughboys unit insignia in the other, with the motto, "WE LEAD."

An appropriate presentation ceremony was held on Christmas night and everybody was happy except for one thing. Someone had spread the rumor that the Japs had captured the PX.

"A black and dastardly lie," declared a 5th Air Force spokesman. "We haven't got a PX." ☆

AAF QUIZ

WHAT'S YOUR AIR FORCE I.Q.?

Five points for each correct answer. Above 90 is tops; 75 to 85, good; 60 to 70, not too bad; below 60, tsk, tsk. Answers on Page 59.

1. China-based B-29s' first target was
A. *Yawata* C. *Bangkok*
B. *Tokyo* D. *Nagasaki*

2. The P-59 is a
A. *Twin-engine fighter*
B. *Rocket propelled fighter*
C. *Glider towing fighter*
D. *Jet propelled fighter*

3. The Commanding General of the 21st Bomber Command is
A. *Maj. Gen. Millard F. Harmon*
B. *Brig. Gen. Haywood S. Hansell, Jr.*
C. *Maj. Gen. Curtis E. LeMay*
D. *Maj. Gen. Kenneth B. Wolfe*

4. Mandalay is located in
A. *Burma* C. *India*
B. *China* D. *Thailand*

5. The designation of Special Services Division has been changed to
A. *Activities Division*
B. *General Services Division*
C. *Personnel Services Division*
D. *Morale Division*

6. AAF awards are given to personnel of other nations
A. *True* B. *False*

7. When an engine is idling with throttle closed
A. *The idling jet is also closed*
B. *The accelerating jet is pumping*
C. *The mixture control is open wide*
D. *The main jet is idle*

8. The Jap plane Kate is a
A. *Single-engine three-place torpedo bomber*
B. *Twin-engine multi-place bomber*
C. *Single-engine single-place fighter*
D. *Twin-engine single-place fighter*

9. The distance in statute miles from Manila to Hong Kong is approximately
A. *1,350* C. *1,600*
B. *700* D. *400*

10. The B-29 ordinarily carries how many men in its crew?
A. *11* B. *10* C. *9* D. *12*

11. On the Standard Instrument Panel, the turn indicator is to the right of the flight indicator
A. *True* B. *False*

12. The first landings on Leyte in the Philippines were made on
A. *Nov. 6, 1944* C. *Sept. 12, 1944*
B. *Oct. 20, 1944* D. *Dec. 4, 1944*

13. Korea is located
A. *In the South China Sea*
B. *At the tip of Manchuria, between the Sea of Japan and Yellow Sea*
C. *In the Gulf of Siam, below Hainan*
D. *Between Japan and Formosa*

14. Enlisted men are required to salute enemy officer prisoners
A. *True* B. *False*

15. An air-cooled system is lighter per horsepower than a liquid-cooled system
A. *True* B. *False*

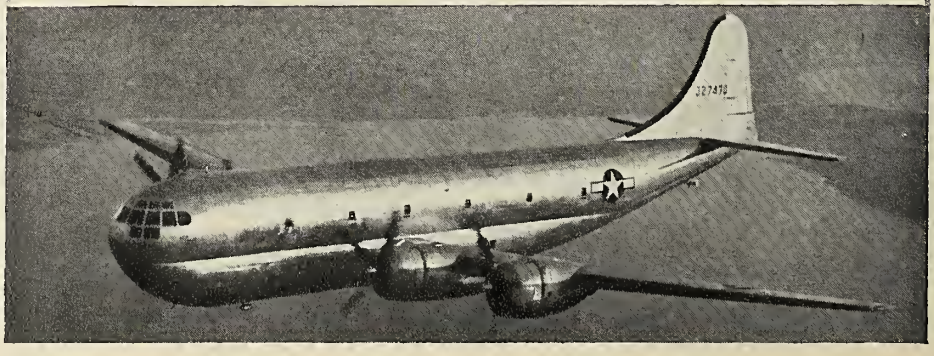
16. Ladd Field is located at
A. *Fairbanks, Alaska*
B. *Cairo, Egypt*
C. *Chungking, China*
D. *Brisbane, Australia*

17. The shoulder patch of the 20th Air Force bears a B-29 replica
A. *True* B. *False*

18. The P-63 is a modified version of
A. *P-51* B. *P-39* C. *P-47* D. *P-40*

19. Time served as a pilot in the air forces of a co-belligerent may be counted in computing service as a pilot in the AAF
A. *True* B. *False*

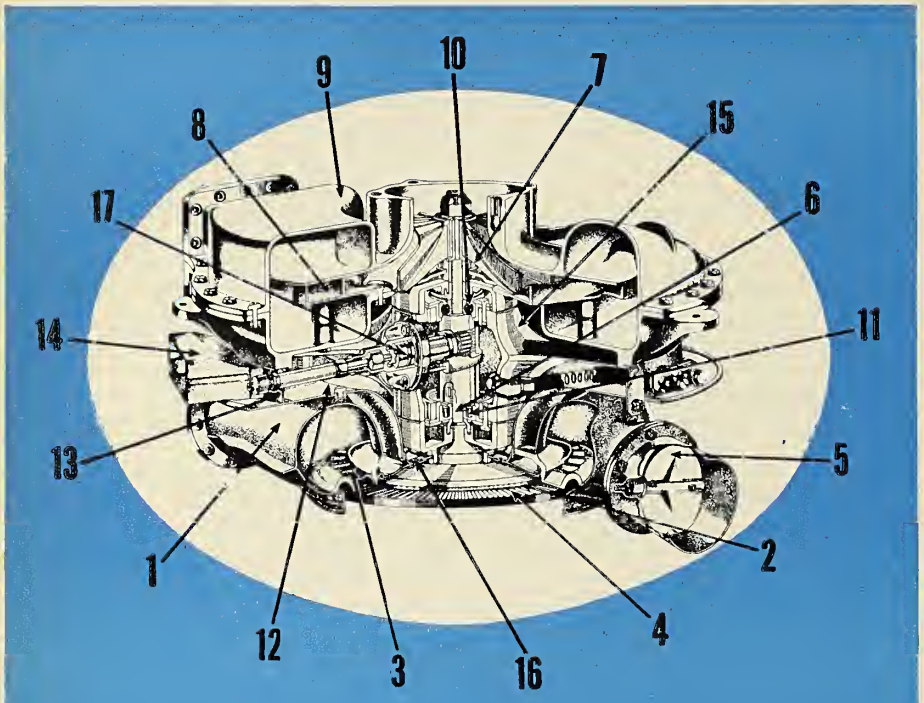
20. Identify this plane ↓



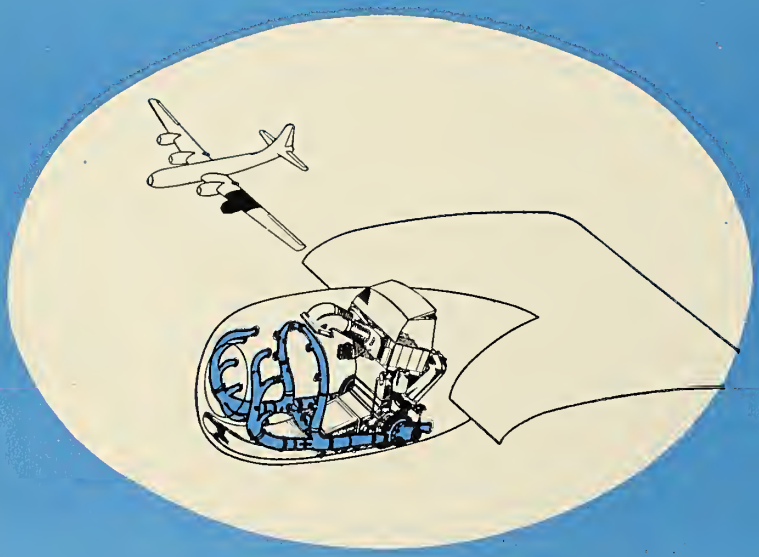
technique

Development, Maintenance and Supply of Aircraft and Equipment

B-29 Modification—See Page 50



Exhaust stack connects to nozzlebox (1) above turbine wheel (2). Heated gases escape through nozzles (3) and are directed against buckets (4) to rotate turbine wheel, while gases not required go through waste gate (5). Power is transmitted by shaft (6) to impeller (7) and diffuser (8) which are enclosed in housing (9) that collects compressor air from diffuser. Ball bearing (10) takes thrust load of shaft, while a roller bearing (11) allows for shaft expansion. Between baffle ring (12) and compressor case, cooling shroud (13) injects air through inlet (14) to circulate around the bearing-and-pump casing (15) and down to sealing ring (16) then up and out of nozzlebox. Lubrication is performed by oil pump (17) while cooling of turbine wheel is accomplished by slipstream air from cooling cap. The diagram below shows two B-11 turbo-superchargers.



Progress in Superchargers

The supercharger does the same thing for an airplane engine at high altitudes that an oxygen mask or pressurized cabin does for a pilot or crew member under similar conditions—allowing it to "breathe" normally in the thin, rarified atmosphere by forcing great power-producing quantities of air at sea-level pressure into its carburetor. As such, it has made a major contribution to AAF superiority by permitting our planes to perform efficiently at high altitudes and by aiding in the development of jet-propelled aircraft.

Basically, there are two types of superchargers. One is gear-driven by the engine itself, either directly or through clutches, and functions as a small centrifugal compressor built into the power plant. It can make an engine behave normally at 15,000 to 20,000 feet, but it is most effective only at the precise altitude for which it is geared. The turbo-supercharger, on the other hand, requires far less drain on an engine's power and affords maximum capacity over a wide range of altitudes, thus giving a decided edge in combat.

Turbo-superchargers consist of a turbine wheel, impeller, nozzle box and compressor case. They operate by conducting the exhaust gases from the engine to the nozzle box, thence through nozzles to the turbine wheel around which is the atmospheric pressure of any given altitude. Exhaust gases, discharged from the engine, expand through the nozzles and buckets and produce sufficient power to whirl the turbine wheel at 20,000 to 30,000 rpm. On the shaft with the turbine wheel is the impeller of a centrifugal compressor which turns at the same rpm as the turbine, raising the air pressure from the operating altitude to sea-level pressure and delivering this compressed air to the carburetor. Air intake and exhaust, therefore, are performed at normal operating pressures, and the engine is able to function at sea-level regardless of altitude.

At present, new designs in turbo-superchargers are being effected to create more power, and technicians are working out means to gear this excess horsepower directly to the propellers, as an auxiliary boost. In addition, the "turbo-engine" can provide a powerful jet, allowing a pilot to climb to high altitudes, feather his props and switch to jet propulsion.

Substantial progress has been made recently along these lines with the discovery and application of new heat-resistant metals, made necessary by the

high temperatures and velocities produced by the 32,000 rpm of the turbine wheels. Manifolds and small turbine buckets were getting red hot, while the compressor on the same drive shaft and only inches away, had to withstand temperatures as low as 70 degrees below zero. A tough alloy was required, therefore, to resist the strain of excessive centrifugal force and retain its strength at high speeds and extreme temperature variations. A new metal alloy was developed composed of chrome, cobalt, tungsten, titanium and other substances and, after extensive tests, was adopted for production.

Types of turbo-superchargers now going into our aircraft are classified in categories according to the horsepower ratings of the engines with which they are used. For instance, a B-type supercharger is employed with engines rated up to 1,200 hp and is installed on B-17s and B-24s. Superfortress engines, developing 2,200 hp, have two of the B-type superchargers operating in parallel. C-series turbos are adapted to engines rated between 2,000 and 2,800, such as those on P-47s, while very large planes like the B-19 use the CM and BM turbo-superchargers. Mounting is accomplished on both in-line and radial engines, either on top, on the side or on the bottom of the engine, provided necessary cooling can be effected.

It should not be assumed that a turbo-supercharger increases an engine's horsepower at high altitudes; it merely maintains its best operating efficiency. In the case of some P-38 engines having combined ratings of 2,850 hp at sea level, it was found that they lost fully 60 percent of their power at 25,000 feet without supercharger installations. With the turbo, however, they were able to pull optimum horsepower six miles above the earth.

Lightweight Landing Mats

Aluminum landing mats, weighing less than half as much as old type steel strips have been developed for airborne delivery to advanced flying fields. The lightweight, portable sections are laid in 10-foot "planks," each of which is about 15 inches wide, and are held together with slide locks.

The new mats are made of 0.188-inch thick aluminum sheet, with a yield strength of 35,000 pounds per square inch. They are ribbed for increased stiffness and pierced with flanged holes to reduce weight. One section weighs 30 pounds as compared to the 70-pound weight of the steel mat section used in previous airfield construction.

tech topics . . . about aircraft and equipment

A body harness which permits pick-up of personnel from life-rafts is being adapted to helicopters that will have mechanical hoists for pulling survivors aboard. . . . A small tailplane surface has been adapted to one type helicopter to help stability and control.

Parachute test dummies now being fabricated have special instruments built into them for recording rate of fall and oxygen pressures at various altitudes. . . . A tough plastic material is being used to increase the rigidity of parachute packs mounted in aircraft at egress stations. . . . Improved ripcord housing with smooth interior bore at the ends and inner lining is now standard for both Army and Navy chutes. . . . Neoprene rubber seat pads for parachutes are being tested to replace present pneumatic type, which costs twice as much.

New flight instruments have been developed for the helicopter. Special gauges to record forward, backward and lateral motions of the craft and air speed indicators to show zero and reverse speeds have been perfected by instrument engineers. . . . New helicopters will incorporate an automatic pitch reduction system. The mechanism operates in response to engine speeds, the pitch of the rotor blades being decreased when the engine drops below a predetermined speed.

The AAF is studying several new types of devices for testing parachutes. One consists of a huge steel tower with a long boom extending outward. At the end of the boom is a parachute dummy. As the boom is swept mechanically around the tower at a speed simulating that of a 400-mph drop, an automatic release opens the parachute and tests it against the opening-impact force to which it would be subjected under actual conditions.

Quickly attachable chest parachutes have been standardized for all airborne operations. These chutes, 24-feet in diameter, permit freedom of movement and are lighter than other types. . . . Metal pack openers for personnel parachutes may replace rubber exerciser cords which sometimes fail, due to loss of elasticity, in cold temperatures. New metal openers have snap feature but still retain desirable flexibility.

A tiny, red lamp on the pilot's instrument panel and a siren-like horn, both controlled by an automatic smoke detector, are parts of a new system to warn pilots and crews of interior aircraft fires. Smoke particles mixed with a steady airstream in a small box chemically actuate the mechanism.

A powerful engine-starter, now in use on some military aircraft is called the "mighty midget." It weighs only 32 pounds and has a five-pound flywheel which kicks over the engines more quickly than conventional starter equipment and packs more power into a smaller space.

Because high pressure oxygen cylinders must be handled with extreme care while loading them aboard a plane, a low-slung, three-wheeled platform with twin clamps to keep the cylinder in place has been designed. The carriages, known as "oxygen trolleys," are hooked together in train fashion so they can be hauled around an airdrome to planes needing refills.

Seventy-five-gallon belly tanks have been converted into containers for aerial delivery of type E-1 life rafts. . . . New spinners for P-51 propeller hubs are being designed to incorporate quick detachable features. The new design will eliminate inaccessibility of nose section retention bolts, a "bugaboo" for mechanics.

Clothes lines: An experimental air blower has been perfected to heat flying suits, which are called "Hot Air Clothes." . . . Helmets made of white cotton twill are being studied for radiant energy as a possible source of heat.

Sample food warmer trays and drinking cups for use on long-range bomber missions are made of stiffened nylon and may replace former metal dishes. A plastic

flask-type beverage container which fits in the knee-pocket of standard flight suits is being developed for fighter pilots.

Handy computer aids bombardier in making quick calculations.

Computer for Bomb Spacing

A bomb spacing calculator to augment the bombsight and insure proper setting of the intervolmeter, which releases bombs in salvo, individually or in train, has been devised by the Applied Mathematics Panel of the National Defense Branch Council in collaboration with Armament Laboratory personnel of ATSC. The computer is in the form of a circular slide rule and solves the complicated equation for direction of attack, aiming error, altitude, size of target and number of bombs to be dropped. Correct spacing of bombs can be obtained by an expert bombardier in 15 seconds, and can increase probable hits by as much as 50 percent in certain situations.

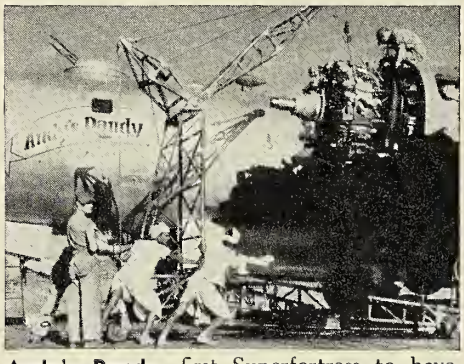
At present, these spaeers are being used by 8th Air Foree bombardiers in the ETO, but operations officers on the ground also use the disc to determine the number of bombs needed and the number of planes required for the destruction of a particular target.

B-29 Modifications

From the time the B-29 first reached maintenance lines, many modifications have been instituted, ranging from propellers to rudder, and, while they have not resulted in major changes, they have served to increase the effectiveness of the Superfortress.

The early B-29s were equipped with Hamilton Standard propellers, having No. 24F60-13 hubs. Later, however, these hubs were changed to the 24F60-23 type in order to improve high altitude operation. This means that props now have four bleed holes in the piston rather than two, minimizing the congealing of oil in the dome under low temperature conditions. Cam and blade gears have been re-indexed to alter the relationship between blade gear segments before the cam rollers reach the knee in the cam slot. And the feathered position of the piston was moved farther aft to decrease the possibility of having the congealed oil in the dome prevent feathering.

Because the Superfortress "grew as it flew," many modifieations were suggested by performances in actual combat tests. It was found that the 2,200 hp Wright engines, while pulling big bomb loads on the long run to Japan, had a limited life expectaney whieh made frequent engine changes necessary. Diagnosis showed that overheating was caused by inadequate lubrication and misdirected airflow. After six weeks of intensive work at the Oklahoma City Air Depot, however, the engines were fitted with baffling eylinders and ducts to provide better distribution of air and to improve cooling.



Andy's Dandy, first Superfortress to have its powerplant modified, undergoes engine change at its 20th Air Force base in India.

Crossover tubes were installed between rocker boxes to furnish the needed lubrication, and rocker arms were reworked, drilled and gouged out to allow free passage of oil. More recent design ehanges in carburetion have further improved engine cooling.

Combat performance also proved the desirability of providing the engineer's station with some means of stopping the B-29's auxiliary power plant. This was accomplished by installing a control circuit consisting of switches at the engineer's panel and at the auxiliary power plant, indicator lights, wiring and a relay in the magneto ground circuit. Also on the same instrument board, liquidometer totalizer-type fuel gauges have replaced the liquidometer gauges that incorporated transfer switches in the transmitters. The float arms on the new gauges are lengthened, bringing the floats nearer to the chordwise center of the tanks, where the fuel level is least effected by variations in the pitch angle of the airplane during flight.

The two ignition distributors mounted on the nose section of the R-3350 engine must be kept free of oil to prevent fouling of the finger contacts. On previous models of this engine, the distributor oil seal consisted of a spring-loaded neoprene grommet and collar arrangement. At present, however, Garlock type seals are used at this location to provide more effective sealing and maintenanee simplicity.

On the tail of the B-29, an advantageous change in aerodynamic balanee was effected by installing a rudder with a triangular leading edge. This permits the use of larger amounts of balance than that of rounded leading edges without destroying the "feel" of the rudder movement.

Acetylene Beacon Light

A light that burns for a year has been developed by the AAF as a warning signal to be plaeed atop high peaks and other obstacles located in isolated areas over which our planes must fly.

The new beacon (Type C-3) is an acetylene burning lantern assembly designed for installation where electrical power is not available. Its on-and-off action is completely automatic, and once installed it will operate for 365 nights without adjustment or refueling. Components include a base whieh houses lighting apparatus and filters, a main burner and pilot burners, special optical elements, a flash regulator, acetylene cylinders for fuel supply, and a sunvalve for turning the light on after dark and off during daylight hours.

In operation, a 400 candlepower beam is flashed for .2 of a second, 30 times a minute, and may be seen for approximately 12 miles. Upper and lower lenses with red filters throw the light in a complete circle so that it can be observed by pilots approaching from any direction. The main burner has a

Long-term beacon light is automatically controlled. Shack contains acetylene tanks to fuel lantern nightly for an entire year.

three-cluster flame ignited by two constant pilot lights. Small holes in base permit enough air to maintain flame, while the baffling prevents the light from being blown out by high winds.

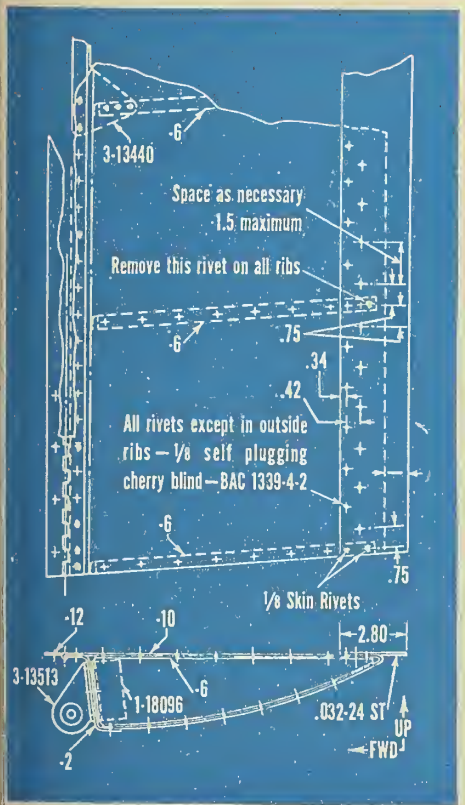
The beacon's nightly illumination is accomplished by the sunvalve device, which consists of four light-actuated metal rods, compensated for temperature change, which expand and contract with outside light variations. This produces energy to operate a valve, which governs flow of fuel to main burner.

The long-term lamp has already been installed at several hazardous points near airbase operations. It may also be used as an airway marker.

B-17 Trim Tab Modification

An airfoil-type trim tab was introduced recently on B-17 elevators, replacing the old elevator down-spring in order to provide greater stability back to 35 percent Mean Aerodynamic Chord. The original horizontal stabilizers and elevators were built to furnish stability back to 32 percent, but as loading aft of this became more common, the bulbous tab was adopted as an aerodynamic improvement.

However, as with any device on control surfaces giving greater stability with free controls than with fixed controls,



Trailing edge extension for elevator trim tab assembly. Reference may be made to AAF drawing 14-3638, sheet 2, for construction.

maintenance tips . . .

from the crew chief's stand

Bearing down on bearing trouble in HXD engines of C-2 wreckers and F-1 fuel servicing truck-tractors, our experts have traced the difficulties to high engine rpm, low oil pressure and grit entering the crankcase. The following points are suggested to remedy the situation:

1. Set engine governor for not more than the maximum rpm authorized by TO 19-25-78.
2. Check oil level carefully every 100 miles, as outlined in TOs 19-20-16, 19-25-51, 19-25-53.
3. Keep oil in air cleaner.
4. Remove junction box to crankcase heater tube and close openings (see TO 19-1-135) to prevent grit entering crankcase.
5. Check oil scavenger lines for chafing against main oil pressure line and baffle troughs.
6. Keep check on oil pressure. At 400 rpm it should be 15 psi, at 1,600 rpm 35 psi when engine and oil are at operating temperature.
7. If crankshaft must be replaced, make sure new shaft is equipped with the new counterweights.

You can give your oxygen compressor worries the air by employing specified fuel. In many instances, failure of these portable units is due to the use of leaded gasoline, for which the engines were not designed. Officers in charge should see to it that the proper type of white, unleaded gasoline is procured so that operators will not be plagued by recurrent burning-out of compressor engines.

You may have a mechanical mind—but do you remember to wind it up? Necessary details forgotten—like a routine generator check—may result in trouble when the plane gets upstairs. Make certain all pressures and temperatures are within limits and that all flaps, cowl flaps, oil cooler shutters and coolant shutters are in prime operating condition. This is especially important in aircraft equipped with electric propellers but it is equally vital with hydraulic props.

Don't be all wing and no landing gear when it comes to preflight testing. It's fun to imagine yourself soaring over cloudbanks, but keep both feet on the ground

and take your job seriously. On planes equipped with full feathering props, for example, always check the feathering motor for operation. Push in the feathering button at an engine speed of 1,700 rpm and after a drop of 300-400 rpm, pull the button out manually. This insures that the feathering pump is operating properly. Don't full-feather the propeller, however, as this action puts an excessive load on the engine.

Mechanics always like to see their pilots come home safely. For many happy returns, pay particular attention to the magneto check. Test magnetos at low power before giving them the gun at rates usually recommended in order to detect faulty ignition. Never take chances with magneto trouble because a single fouled plug can lead to detonation and subsequent engine failure.

Something you might save for a brainy day is a fuel-consumption checking idea tried out successfully at Pocatello, Idaho. To keep track of performance of both pilots and airplanes in P-47 training, a short, simple form was drawn up to show any marked deviation from normal averages of fuel consumption, giving indication of improper use of power or poor maintenance and bad engine condition. A mimeographed form, spaced for airplane number, type of mission, duration of flight and number of gallons of fuel consumed, will provide the information necessary to indicate when investigation and corrective measures are required.

Here's light on the subject of field expedient runway markers. With two empty sandbags, a standard 5-gallon can of diesel oil, 6 feet of wire and a large nail, a flare may be constructed that will burn for more than 36 hours without attention and will require a king-size typhoon to blow it out. First, roll up the sandbags and bind them tightly with the wire to form a wick. Force the nail through this wick about three inches from its end, like the crossbar of a T, so that it serves as a stopper when you slip the burlap into the opening of the can. To ignite the flare, moisten the protruding end of the wick with gasoline or diesel oil and apply flame. To extinguish, smother with burlap that has been dipped in water.

some tendency to oscillate was anticipated. Various degrees of camber were tested, with the best average being ¾ inch. With greater curves than this and loadings aft of 35 percent, long-period oscillations, which varied in proportion with the airspeed, resulted.

To eliminate the undesirable characteristics of this airfoil-type tab and to prevent the plane's tendency to pitch and oscillate under certain conditions of load, altitude and power setting, the 8th Air Force has recommended a simple remedy which bears the endorsement of Boeing and the ATSC. A strip of .032 inch, 24ST aluminum alloy sheet is riveted on the top of the tab trailing edge so it will extend the length of the tab and project one inch over the trailing edge. The elevator then is rebalanced by adding 1.4 pounds to the counterweight.

Anti-Gravity Suit for Pilots

"I'm damned if I would fly without my G-suit," exclaimed 1st Lt. William Krauss, member of an outstanding P-51 group in the ETO who had just knocked off a couple of German planes. "I had to go through a lot of turns that once would have blacked hell out of me, but the G-suit kept my head clear all the way."

The Berger G-suit, heartily acclaimed by all who wear it, is an overall wrap-around, lightweight, inelastic pair of pants extending from waist to ankles. Supported by built-in suspenders, it is donned in the same manner as a zipper-type flying suit. Five rubber bladders contained in the suit draw air pressure from the exhaust side of the vacuum instrument pump and compress the pilot's abdomen, thighs and calves during aerobatic maneuvers, thus preventing "blackout" by equalizing the G force that opposes the return of blood to the heart from the lower extremities.

Pilot adjusts anti-G suit before flight.

Normal gravity force—or G—on the human body is plus 1G. When this is increased to plus 2G, it means that a centrifugal force equal to twice the actual weight of the man is pulling down on him. And with gravitational force equal to 4G or 5G, reflexes become slower, sight is dimmed, muscular action is lethargic and unconsciousness is not far off.

When there is no undue force, the bladders remain deflated, but during dive pullouts and extreme turns when centrifugal force pushes the pilot against his seat, the bladders are automatically pressurized at the rate of one pound per square inch per G above 2G. By inflating beneath the skin-tight garment in direct proportion to the amount of centrifugal force exerted on the pilot, the

what's wrong with this picture?

We take off from maintenance errors this month and land on problems of supply, with the stress on typical mistakes made in packaging reparable items. Such veteran material deserves the same care as that given to serviceable or new equipment, and improper packaging will ultimately result in shortages on the line. The man in the middle cooly claims to have wrapped up five glaring discrepancies along with the turbo-supercharger, but look for others before checking your findings against the bill of lading on Page 56. The handle-without-care detail includes (left to right) Pvt. Rick Clary, Pvt. Richard M. Nicholls and Cpl. Archie McVay, all of the 4100th AAF Base Unit, Section G, Patterson Field, Fairfield, Ohio.

bladders compress the abdomen, legs and thighs, thus neutralizing the G forces of maneuvers and maintaining an equal distribution of blood throughout the body.

The G-suit is worn over uniform trousers and under flying clothes, or next to the skin beneath the summer flying suit. It is connected to the air supply through a simple quick-disconnect plug beside the pilot, while pressurization and deflation of the bladders is controlled automatically by a spring-loaded weighted valve, according to the amount of G being endured.

Emergency Kit for High Altitudes

The Gallagher kit, which represents a new departure in first aid treatment during flight at high altitudes, has been used successfully in 8th Air Force bombers and has now been adopted for all B-29s. A feature of the kit is the "pressure bandage"—a gauze pad stuffed with packing material with bandage roll attached—which forms a pliant but firm covering for large and small wounds and eliminates all need for the conventional tourniquet. This dressing has been designed for quick, easy application in low temperatures during violent evasive action, when it is difficult to maintain balance. Easily handled by gloved hands, it effectively binds the wound without shutting off the flow of blood and, in the case of broken bones, two or more of these bandages may be used in making a comfortable splint.

A quantity of morphine in the kit is kept in a special, heated compartment which may be opened without removing flying gloves by breaking open a built-in lock. Also included are sulfa drugs, standard-type dressings and a safety knife to facilitate the slitting of heavy clothing when a compression bandage needs to be applied.

Padded pressure bandage

Kit has new bandages as well as standard types.

The case itself is made of sturdy plastic, curved to fit the contours of bomber and transport fuselages, thus conserving vital space. If the plane is forced down at sea, the container acts as a self-sealing, buoyant life raft which will support the weight of an average man for some time.

Both kits and contents were developed by Col. John L. Gallagher, a member of the staff of Valley Forge General Hospital, Phoenixville, Pa.

Unloading of patients from C-47 hospital plane into waiting ambulance is made easy by means of this canopied ramp constructed from salvage by the 20th Ferrying Group, Nashville,

At the ATC's European Division terminal in Scotland, a wounded American is carried aboard a C-54 by way of home-designed steel ramp. In two parts, botton section alone loads C-47s.

Hospital Plane Ramps

Two hospital plane ramps, both designed to load and unload air evacuation patients with greater speed and safety, have been constructed at two major ATC bases in different parts of the world.

At the 20th Ferrying Group, Nashville, Tenn., a C-47-to-ambulance canopied passageway, built entirely of salvaged material, protects litter cases from accidents due to slipping or loss of balance. The steel framework supporting the structure consists of old Vultee tow bars, while a renovated parachute stock pile cover forms the sides and top. Non-skid material is used for the slope of the ramp floor, and three shielded dome lights, taken from a crashed attack bomber and powered by a reclaimed sub-standard battery, provide illumination. The ramp weighs 2,000 pounds and can be moved by one man. A special lock on the retractable wheels holds the ramp solidly in place when in use. It is 22 feet long, 6 feet wide, and 12 feet high at the end which touches the plane.

At an ATC base in Scotland, a steel

on the line

with mechs around the world

Like theatrical road companies making one-night stands, service groups of the 9th Air Force hop from one captured airfield to another near the German border. And a most important piece of equipment at such advanced bases is a good mobile control tower.

Claimed as the classiest in Europe is the tower constructed by S/Sgt. Harthel Scott, Boaz, Ala., Sgt. Mason Winebriner, Hot Springs, Va., and Pvt. Eulon Zorn, Samson, Ala., all members of a P-47 service unit commanded by Lt. Col. George Bibby, Cumberland, Md. Salvaged glider plywood built on a 2½-ton Army truck forms the shack, which is crowned by a roomy plexiglas tower, affording perfect visibility in all directions.

With the regulation kit for testing B-29 electronic turbo-supercharger controls on TD elsewhere, Sgt. Willis Kramer of the 13th Air Force Service Command in the Southwest Pacific had to "make do" with his own setup.

Using a B-2 field lighting case powered by a 24-volt battery, his apparatus incorporates an electronic control system identical with that of the airplane, except for the governor control. Any part of the plane's control system believed to be defective is disconnected from the unit and connected to the test kit. Operation of the boost selector control knob starts the waste gate motor, while the "pressuretrol" simulates changes in the carburetor deck pressure and gives synchronized movement of the waste gate. Separate testing of each element of the plane's control system quickly isolates irregularities.

That famous foundry that S/Sgt. Edward Dillon, Cleveland, Ohio, operates to the advantage of fighter and bomber maintenance crews in the CBI now turns out fully 500 different items cast of brass, aluminum, zinc and babbitt metal. As reported in these pages in May of 1944, the foundry was improvised to mold critical spare parts as they were needed, turning out gears, plates, pistons, sway braces and other tailor-made articles. A prime difficulty in setting up shop was finding a sand that could be mixed with molasses to produce the proper molding solution, but after experimenting with various types of local topsoil, Sergeant Dillon "dug up" a sand of suitable consistency.

Putting things on ice was no problem to Cpl. Edgar W. Chapman, Charlottesville, Va., when a shortage of this useful commodity occurred at his 15th Air Force base in Italy. A former refrigeration engineer, he constructed an ice plant out of wrecked compressor components and salvaged airplane parts. High pressure lines were welded to scrap iron supports and expansion coils were devised from spare tubing. The plant operates at 20 degrees above zero and produces 500 pounds for local requirements.

A self-propelled generator mounted on the chassis of a three-wheel gasoline scooter now provides external electric current for starting airplane engines or for checking radio and other electrical equipment at the Wichita, Kan., airport, headquarters of the Midwestern District, ATSC. The scooter is driven right up to the parked planes, where cables may be plugged in to transmit power. In constructing the vehicle, the scooter's metal toolbox was taken off and replaced with a plywood base. A standard generator with its wheels and handle removed was then anchored to the base and grounded to the scooter frame, with headlamps remounted on the front of the generator. The idea was executed by Millard Terry, Merle Buck and Joe Finck, civilian mechanics at the field.

Stymied by lack of an efficient test stand for Packard - Rolls Royce Merlin engine starters and clutches, men at an ASC depot in England built a test fixture from a Prony brake stand and parts of an engine housing. The rig performs a half-hour job in two minutes and speeds the flow of airplane starter clutches from the depot's assembly line. Removable plate in the rear of the clutch permits adjustment without taking it from stand.

Claiming speed record for P-47 engine change, these 9th AF mechs in Belgium did job in 4½ hours. L. to R. are M/Sgt. Ernest Worle, Lewiston, Ida., Sgt. Bill Schiering, Mt. Healthy, O., and S/Sgt. Ron Zimbleman, Phillipsburg, Kan.

Carburetor floats are in 'hot water' with leak test method devised by Sgt. Warren A. Johnson, Detroit, Mich., at an ASC Depot in England. Float is weighted down in a jar of water, then placed in decompression chamber from which air is withdrawn until 23 inches of mercury registers in manometer. Atmospheric pressure inside float being higher than air inside chamber, bubbles will form in water if there are any leaks in the float.

loading ramp has been fabricated in two 23½-foot sections, each fitted with swivel-type wheels. The bottom section is used to convey casualties into C-47s, while the second section, when connected, reaches the door of a C-54, eight feet above the ground. The ramp is four feet wide.

The Nashville ramp was worked out by Lt. F. A. McGlone, officer in charge of Manufacturing and Repair Section of the 58th Squadron, and George Allen, civilian superintendent of Aircraft Shops, 20th Ferrying Group. The structure in Scotland was constructed by a local shipbuilding company from plans drawn up by air evacuation medical officers and ATC engineers.

Facts by the Square Mile

Word from above, in the form of a shower of Allied leaflets, have been effectively distributed over the Balkans and southern Germany by the 15th Air Force's large-capacity "propaganda bomb," adapted from the M-26 flare.

With a wide territory to cover, it was desired to use a container that would explode somewhere under 2,000 feet with sufficient force to insure the greatest possible dissemination. Italian artillery propellent charges, captured in large quantities, provided the right explosive charge. They were wrapped in individual silk bags and fastened in place just behind the flare's nose fuse and booster. Five and a half rolls of leaflets—with 1,500 leaflets to a roll—were packed in the finished bomb.

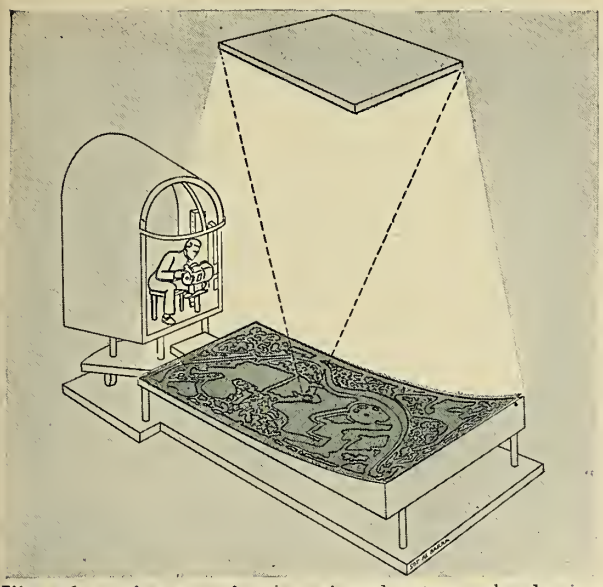
The missile with a missive weighs 51 pounds and is sealed with a standard cover and tape. The tear wire is removed from the M-26, and only the swivel and arming wire is used.

In Burma, a leaflet-dropping device has been made by U. S. fighter pilots from a 150-gallon belly tank. A plunger governed by a small electric motor expels the leaflets in bundles, which break open and scatter in the slipstream. If necessary, the pilot can jettison the leaflet tank.

New Bombing Trainer

A portable, life-size model of a bombardier's compartment, complete with Norden bombsight, bomb-rack controls, switches and instruments, now enables a bombardier in training to simulate almost any tactical situation.

Designated the A-6 Bombing Trainer, the device projects a moving terrain area recorded on plates onto an overhead mirror and back to a screen where it appears to the bombardier exactly as he would see it from his station in a



Film of moving terrain is projected onto overhead mirror where image is reflected back to screen below, duplicating bombardier's view. Trainee sits in fully equipped mock-up of bombing station, ready to "release" his simulated load.

bomber. The direction of ground travel is coordinated with the position of the plane at any speed from 125 to 250 mph and at altitudes from 2,000 to 20,000 feet. "Bombs" are represented by a series of tiny lights to the left of the bombardier as he mans his bombsight, and they can be "released" singly, in train or in salvo. Hits are recorded by pinpoints of flashing light on the screen below, but only after an interval of seconds corresponding to the time it would require for a real bomb to fall from the assumed altitude.

Information on this device may be obtained by writing through channels to the Training Aids Division, One Park Avenue, New York 16, N. Y.

Maintenance Contest

A contest to improve production-line maintenance systems was recently initiated at Cochran Field, Ga. A banner is to be displayed in subsection engineering offices for the best maintenance performed each month, and a trophy awarded to the section winning the banner the most times in a six-month period. Scores are based on lowest daily percentage of aircraft out of commission for first echelon maintenance, general condition of airplanes, cleanliness of planes and equipment, and neatness of section areas.

Aeronautical Board Seeks Ideas

The Working Committee of the Aeronautical Board, a joint Army-Navy agency, has asked all AAF maintenance personnel to submit suggestions on aircraft parts which they believe could be standardized for interchangeability on either Army or Navy planes in order to facilitate fabrication methods and effect substantial savings in time and money on contracts. Ideas should be forwarded, through channels, to the Air Technical Service Command at Wright Field, Dayton, Ohio.

If a suggestion is found to be practicable, specifications may be set up to apply to the particular item, no matter how many different manufacturers make it or how many different planes use it, thus simplifying the work of the maintenance man and, in many instances, preventing planes being grounded for want of a special part.

The Aeronautical Board was established by executive order to effect cooperation between the Army and Navy in the development of aviation. Members include General of the Army H. H. Arnold, Maj. Gen. O. P. Echols, Vice Admiral H. W. Fitch and Rear Admiral D. C. Ramsey. The Working Committee is headed by Lt. Col. G. R. Gaillard, AAF, and Commander E. C. Beck, USN.

Absolute Altitude Altimeter

An altimeter that uses radio and electronic waves to measure absolute distances above the ground is being installed in AAF planes to provide a safety factor not available in standard pressure-operated instruments. Supplementing barometric types which record only "above sea level" altitudes, the new instrument acts as a terrain clearance indicator by sending out a radio impulse which strikes the ground and reflects back to the plane. The elapsed time of beam travel is computed automatically and visually registered as absolute altitude on the pilot's instrument panel. In principle, it is similar to bouncing a ball against the floor and measuring the distance by computing known speed of the ball and the time that it takes to hit the floor and bounce back into your hand.

The instrument gives readings of height above terrain on two scales—200 to 5,000 feet and 5,000 to 50,000 feet—as selected by the pilot to suit flying conditions. The system can not be used with accuracy below 200 feet, since it is difficult to compute the difference between outgoing and incoming electronic waves at that altitude. The major components of the altimeter include a combination radio transmitter and receiving set, a sending and receiving antenna, an automatic computer and a dial to show the indications. Instead of a pointer common to ordinary altimeters, the dial has an electronic circle which bulges into an arrow-shaped pip at appropriate altitude markings.

Medium and heavy bombers now carry the instrument on cockpit panels.

Packaging and Corrosion Control

The big problem in AAF supply shipments, particularly in view of redeployment routing from ETO to other bases when the war in Europe is over, is the proper packaging of equipment to withstand all adverse weather and transit conditions, according to Maj. D. L. Batten, Packaging Coordinator, ATSC.

To prevent corrosion, which may take place far from the point of original departure and is difficult to detect, Major Batten recommends the following procedures:

Clean parts not subject to damage by spray or immersion with petroleum solvent, stock No. 8500-908000. Use two tanks, one for immersion and the other for rinsing. Parts which may be harmed in this way should be wiped clean. Dry by hot air blasts. Do not handle parts with bare hands during and after cleaning. Use canvas or rubber gloves.

For preservation of items that can be dipped and cleaned without disassembling, immerse in rust preventive compound, stock No. 7500-054300. After dipping or brushing, wrap part in No. 8700-514760 Grade A grease-proof paper, with red side next to treated item. This is Method I preservation.

For more critical surfaces, such as moving engine parts, Method 1-A preservation is employed, which specifies that after cleaning and application of rust preventive compound, a conforming wrap must be made in Grade C moldable paper (No. 8700-514756) with the smooth side next to the treated part. All flaps should be securely pressed down and No. 7300-827550 sealing wax applied.

Method II preservation is reserved for instruments, intricate assemblies, radio equipment and similar items. Apply a light lubricant to the item and place it inside a moisture-vapor-proof bag, heat-sealing with a small iron. A moisture indicator (silica gel) stock No. 7800-436560, should be inserted inside

of transparent bags before sealing. If suitable bags are not available, wrap item tightly in Grade C paper, place in a box with a drying agent, cover the box with more of the paper and dip in sealing wax.

In general, when time is short and the number of individual items is large —bolts, nuts, screws and the like—use small cartons with joints and flaps secured with gummed Kraft tape and dipped in stock No. 7300-984000 sealing wax.

WHAT'S WRONG with the picture on page 52

1. That air-conditioned wooden crate won't give much protection to the turbo-supercharger on its mission to the repair depot. Vital items such as this need the strong escort cover of standard turbo-supercharger containers or suitable substitutes. Always use a substantial wood case that protects equipment from rust and corrosion as well as shocks encountered enroute.

2. The regulation box on the left, being subjected to a heavy crowbar attack, is the one the boys should be using. It is sturdily built and put together with bolts which must be removed with a wrench before it can be opened. That direct assault operation will only result in kindling wood and a disability discharge for the packing case at a time when it is needed most.

3. The man on the platform—unless a runner from the engineering office stops him in time—is about to include a reparable generator along with the supercharger. Two such unlike pieces of equipment lumped together haphazardly, without regard to relative weight and size, will inevitably add up to a sadly broken candidate for the generator salvage heap. Be sure to pack generators in metal containers or in a well-reinforced package to insure safe transit.

4. What is that mournful object huddled inside the crate, apparently awaiting its rendezvous with the rest of the formation? No doubt your 20-20 vision has already told you that it is a piece of damaged wing-tip which cannot be repaired. The supply officer at its destination will hit the ceiling when he sees it because he expects shippers to check master reparable lists before wasting valuable space with cowling wing sections and other odds and ends that will not be patched up anyway.

5. The supercharger won't have a fighting chance for survival if it's not bundled in its waterproof envelope. The bit of torn paper shown will do mighty little to prevent corrosion and damage, in which case the assembly will not be fit for repair when received.

The Intercom

AIR FORCE presents these answers to its Question of the Month. Replies are those of personnel recently returned from combat duty.

QUESTION: Which member of the ground echelon at your station gave you the most help in completing your tour of duty?

1st Lt. Jack B. Moore, pilot, England: "Mechanics and the squadron engineering officer helped me most. Once the mechanics were trying to set a theater mark for no turn-backs with our plane. Unfortunately it burned out an engine on the 68th mission and I had to come back. I really sweated out my crew chief. I dreaded to face him much more than I did the abortives board. In fact, I worried more about the chief than the possibility of running into fighter opposition. All the way in I was hoping it had been a genuine engine failure: It was, and everything was OK with our mechanics."

1st Lt. Eric A. Johnson, pilot, Corsica: "Our flight surgeon helped me complete my tour of duty, as he did many other crew members. He kept close watch over us and knew just when to send us on a rest cure. In fact, he knew so much about pilots that he could study a flyer for a few moments and then tell him almost exactly how many missions he had flown. He could also tell how many rough ones there had been. In a quiet, informal way our flight surgeon was studying us all the time. He got the most out of us in order to satisfy the big shots and at the same time he didn't drive a man too far."

S/Sgt. Henri Wohnsen, gunner, England: "There were a great many things that helped me get through my missions, and they are the things which would still please me if I am sent back to England. They kept up my morale. First, I like the countryside over there, covered with more flowers than you can imagine, and for another thing I would never get tired of wandering around London. English girls are about the friendliest people I ever met. They don't act as if they own the whole damn world, and I admire that. Then, they have plenty of dances. You should see some of those girls jitterbug."

S/Sgt. Douglas L. Leith, engineer-gunner, Corsica: "It all comes from the mechanics wanting you to come back. They not only kept our plane in perfect condition, but they were there to wish us good luck, and greet us when we came back from every mission. You get closer to those guys than the ones you fly with. They are the ones who got me through my tour of duty and I give them the credit. You've got to see a crew when their plane is late to know actually how mechanics feel about the airplane in their care. My plane had only minor mechanical trouble during my entire tour of duty."

T/Sgt. George T. Barrett, radio operator, Italy: "The GI bartender at my station did his part toward getting me through my missions in good shape. He was jolly, had a red face, a round belly and talked in that easy, friendly way of an American bartender. It wasn't so much what he served, as the way he served it. He got to know every fellow who came into his place and he would whip up a favorite drink without being asked for it. That made it seem like a neighborhood bar at home. We all liked this guy. We called him Red. He's still over there with his apron on, keeping the boys happy."

S/Sgt. John Griffin, gunner, Italy: "In my case it was a personal friend from my home town, a corporal a few years older than I am. He was the kind of a fellow who could understand other people, and occasionally he would notice that I was getting bitter. Without saying very much about it he would get me into a bull session and we would talk about the people we both knew back in Reading, Mass. He could get my mind off things which were bothering me and first thing I knew my spirits were up. Next day I'd be back in the turret doing my job and feeling better than I had for a month."

Rendezvous

(Continued from Page 3)

good charts when things go smoothly, but let the pilot make two or three turns to avoid a cloud or another formation, and they are lost. A pilot making a 360° to let another group catch up, will almost always bring from the navigator a wail of 'Where am I?' In regards to that, the pilot should always tell the navigator when he is going to do anything not planned.

A good navigator will:

1. Call the pilot one minute before a turn and tell him which direction the turn will be and how many degrees he must turn. This is immensely helpful to element and squadron leaders. They can 'play' their turns with the group and not overrun or lag.
2. He will get a good wind on initial climb and not get to the assembly point two minutes late or ten miles off course.

That's about it. Of course, we are flying a B-24 in the ETO and conditions may be very different elsewhere.

Lt. John W. Eggleston & crew,
APO 558, NYC.

Pretty Good, Huh?

Dear Editor:

In your November issue you asked for a safety record to top those you had printed. Here it is.

The First Air Transport Squadron (mobile) has operated over the "Hump" and over hostile territory in China for more than 11 months with only one accident. During this time the crews have amassed more than 40,000 flying hours. All of the original aircraft, with the exception of one which crashed and another which was hit by enemy bombs, are still on full scale operations.

Pretty good, huh? Incidentally the type plane used is the C-46A, considered by so many to be a "bad ship."

Lt. Rus Walton, APO 493

Show Off

Dear Editor:

. . . I'd like to tell you how I was cured of a childish and dangerous practice.

Last summer, shortly after returning from overseas, I was sent to a base in the South to take an instrument course. Our entire class was composed of combat returnees and, with the exception of a dozen or so, we had all been together either overseas or in the States. Furthermore, our specialty had been heavy bombardment. Thus, I took it for granted that the few pilots whom I hadn't known before were also . . . heavy bomber pilots.

The type of aircraft flown during the course of instruction was an AT-6. The flying period consisted of one ride with the instructor and two buddy rides. Most of us were elated over flying single-engine again as some time had passed since any of us had enjoyed the sport of a light, easily maneuverable plane. The planes were restricted as far as genuine acrobatics were concerned due to the sensitive radio equipment which all of them carried. Nevertheless, while on a buddy ride if you were in the rear cockpit

(Continued on Page 60)

THE AAF LOOKS AHEAD

(Continued from Page 14)

try, electronics, the sciences basic to rockets, jet propulsion, radar, and revolutionary developments as yet unconceived.

✗ It must also be fully understood that scientific research and development will not of themselves keep the United States in the lead. Scientific and tactical advances must go forward hand in hand and be reflected in the aircraft, armament, equipment and weapons actually being used by our air forces. All of our present aircraft, our powerplants, and many items of essential equipment are in a sense "obsolete"—in that they are or may shortly be surpassed in utility or performance by other equipment, in the blueprint or mock-up stage, but not yet in production. Unless our air forces can continually improve the equipment in use—we will find ourselves subject to attack by others with no answer except to "take it on the chin" until we have created modern equipment through overtime methods. That is a very expensive practice.

The American people must never again assume—as after the last war and as the French did up to the break-through in 1940—that numbers of aircraft and quantities of equipment make an air force. A second-rate air force is worse than none because it gives rise to a false sense of security—which bombs may quickly demolish.

✗ Even an up-to-date air force in being may not constitute airpower. Preeminence in the air implies maximum ability to maintain and expand existing establishments. There must be a strong and healthy aviation industry, building thoroughly modern aircraft and equipment, and developing, testing, and experimenting with advanced designs for tomorrow. Segments of industry must be capable of and ready for rapid conversion to quantity production and certain Government-owned plants and production equipment not subject to rapid obsolescence should be kept in standby as a war reserve against the potential aggressor.

The importance of a progressive aviation industry cannot be over-stated. One way to keep it progressive after final victory is promptly to sell, salvage, or scrap excess or obsolete planes so that they will not hang over the Air Force and the aviation industry retarding development. This happened after the last war, but must not happen again. The AAF is already taking steps to meet this situation by declaring planes and equipment surplus as they are currently worn out or no longer useful, and turning them over to the Surplus Property Board for appropriate disposal.

✗ Airpower must be employed from large, fully-equipped, strategically located bases. Our air forces must be able to meet and overpower the aggressor's air threat as near as possible to its source. It is obvious that air operations are already global. Our air forces have learned in the stress of war to operate in all climates and under all conditions. These lessons must not be forgotten. Air power in the future will depend on the possession by our air forces of the knowledge and experience required for immediate and continuing world-wide operation.

✗ In all-out war the Army tactical air force and the Navy air force teams must work closely together with our Army and our Navy. Each must understand the techniques, tactics, capabilities, and limitations of the other. This can only be secured by actual service together in tactical exercises and maneuvers during times of peace.

✗ We have learned and must not forget that from now on air transport is an essential of airpower, in fact, of all national power. The undreamed of development of our fast air transport and the way in which it was used has been set forth in this report and in the report which preceded it. We must have an air transport organization in being, capable of tremendous expansion.

Another lesson taught in this war is that a healthy, self-sustaining commercial air transport industry is vital to the realization of effective airpower. The contribution to the military of our competitive civil carriers in equipment, trained personnel, operating methods and knowledge have been of first importance in this war. The AAF and the nation as a whole have a very real interest in the preeminence of our civil air transport structure.

✗ Troop carrier operations are present-day actualities, as we have seen in Crete, New Guinea, Italy, Normandy, Southern France, Holland and Burma. The American people must visualize that the aggressor's blow may be attended by dropping of large bodies of troops to seize our vital centers. Similarly, to assure our security, we must be prepared to counter this employment of the airplane and to employ it more effectively ourselves.

✗ None of these essentials of airpower will be effective without adequate trained and experienced personnel. In this war, with a very small nucleus, we were forced to start from the bottom with raw material. The AAF Training Command has done a tremendous job in turning out large numbers of navigators, bombardiers, pilots, aerial gunners, glider pilots, liaison pilots, WASPs, and others. It has trained thousands of technicians and specialists essential to airpower. All this took time, but we cannot always count on having time.

There must be in continuous operation an up-to-date training establishment fully supplied with the latest aircraft and equipment. The AAF and the nation must encourage private flying. We must make available to educational institutions aircraft and equipment that can be spared to help familiarize American young men and women with the fundamentals of aviation, for it is obviously upon youth that the nation must rely for its protection against attacks of aggressors. ☆

GLIDERS

(Continued from Page 12)

worn on service ribbons, denoting participation in assault landings on hostile shores.

Certainly those who volunteer for glider training will collect plenty of anecdotes to tell their grandchildren. For instance, the stories that came out of the glider-borne invasion of Burma are straight Hollywood. Consider the drama of the situation a few minutes before take-off, with the tugs ready to warm up, when a photo recon came in with word that one of the two fields they had been briefed to land on had been obstructed by the Japs. In 10 minutes, 53 glider pilots had to be rebriefed so that all landed on the same field.

They took off, heavily overloaded. Some gliders carried 16 fully equipped men with payloads totalling 4,500 pounds—average CG-4A load is 3,750 pounds—and headed up over 8,000-foot mountains. Because of the overload and the continuous climb there were 16 premature releases of which 9 landed behind enemy lines.

Most of them got out OK, thanks to the varied and intensive training they'd received at Maxton. A party of 14, commanded by a British lieutenant colonel named R. P. Fleming, spent a week wandering around enemy territory. In one case they pussyfooted through a field right behind a line of Jap sentries—all of whom were staring intently in the opposite direction. With the help of such tricks of Cowboy-and-Indian days as walking backwards into river fords they made their way undiscovered to the Chindwin—and had to swim it with enemy patrols within spitting distance. When it was all over Colonel Fleming had this to say of the American glider pilot in the party: "To F/O Bruce Williams' skill in landing his glider the party owed their lives. Thereafter he showed both equanimity and enterprise in a high degree."

According to the book, glider pilots on the ground are under the command of the local airborne commander until they can be evacuated to their own base. In actual practice GPs have been moved out with amazing speed—some who took part in the Normandy invasion were back in England a few hours after they'd touched down in France.

However, sometimes they've had to stay and fight for long periods of time. In Burma, for instance, Capt. Vincent J. Rose and 2nd Lt. James S. Bartlett landed their gliders as part of a formation supplying British troops at a place called White City. Almost immediately L-4s and L-5s began evacuating GPs from a strip and all but Rose and Bartlett had been taken out when enemy mortar fire bracketed the area.

They stayed for eight days with a force of 1,800 British troops fighting off an estimated 6,500 Japs. Bartlett operated the landing strip where L-4s and L-5s came in to evacuate wounded whenever enemy fire slackened. Rose, an ex-artilleryman, worked at the artillery OP and both made themselves generally useful. They were part of a great Allied victory and both are proud of their contributions to it.

There seems to be no doubt that the glider boys lead exciting lives during an operation, but some people question the time in between. Lately, as a consequence of the directive that made twin-engine ratings obligatory for new glider pilots, it has been decided that GPs will be given every opportunity to get copilot and pilot time in C-47s. In other words they will be encouraged to keep and develop their power plane skill along with their motorless technique.

What it all adds up to is that the AAF has a new elite—Troop Carrier's triple threat men who are among the most highly trained specialists in any army anywhere. They've already done a terrific job and if they kind of stick out their chests, you can understand it. A wise man won't ask glider pilots—as did a ground officer in an English pub just after the Holland invasion—"What's the 'G' in your wings for?"

The answer came loud and clear: "Friend, you can tell the world for us—the 'G' stands for guts!" ☆

In the Burma campaign many AAF glider pilots found themselves engaged in continuing ground combat, working with British or American forces through some rugged moments.

Tac R

(Continued from Page 13)

He comes across, joins the squadron—and you tell him not to fight. He can't see it right away." Maj. Robert T. Simpson, operations officer from Montgomery, Ala., says much of the time Tac R teams are given routine assignments to cover a specific area. A pilot will be given time over target, say a couple of hours, and the ground liaison officer may say, "Army is worried about this crossroads and these two highways, and you'd better pay special attention to them. Look for any southbound traffic in the area." The pilot and his teammate will work over their area, and every few minutes or so will take a run over the crossroads. Anything of immediate importance is radioed to ground control, which will inform the people concerned. The Tac R men check movements on all primary and secondary roads, look for troop concentrations and watch over rail lines, marshalling yards, heavy gun and flak positions.

The flak maps, which enable our bombers and bomb-carrying fighters to pick the least dangerous paths to their targets, are made up largely from reports from Tac R. Finding out just where flak positions are located is not pleasant work.

When a pilot and wingman return from a mission, their interrogation is much more arduous than that given other flyers. They must give complete details of their flight, tell just what they saw and at what time, and at what place. They will make from sixty to seventy—and good recce pilots more—written observations while on a mission, in addition to visual reconnaissance. The Tac R lads photograph, using both vertical and oblique cameras in their planes. A ground commander may need some new photographs of German positions, and Tac R will go in low and fast and take them. Bomber command may need a quick bomb damage assessment job, and Tac R will be over the target the moment the smoke clears away. Their photo work is not of the precise area-mapping sort of photo-recce squadrons, which is done from around 20,000 feet. Tac R's pictures are taken from much lower altitude.

The artillery adjustment now being done by pilots in P-51s, probably as fast as any conventional craft, amazes both ground and air commanders. Most adjustment by plane is done by fellows in L-5s, but the cubs cannot go deep into enemy lines to watch the effect of big guns which fire fifteen miles or so. Adjustment is necessary for truly effective shelling, and the Tac R fellows have worked out methods of doing it.

Before a pilot goes on an artillery adjustment mission, he spends some time with a ground liaison officer, who tells him where the target is, what type ammunition and what size guns the artillery intends using. The recce team finds the target, gets in touch with the artillery, gives coordinates and calls for fire. The shell may take half to three quarters of a minute to reach its target, and because the airplane travels some three hundred miles an hour, the pilot must be some distance away from the target when he gives the order. He then must

get over the target at about the same time as the shell. He spots where the projectile struck, relays information to the artillery fire direction post, and does this enough times to give the artillery a "bracket"—so many shells right and left, so many front and back—which results in the guns being laid right on the objective. Often while doing this a recce team will spot new targets. First Lt. Donald R. Lynch, for instance, is credited with the destruction of a railroad gun at Metz, which he discovered, pinpointed and bracketed for our own heavy guns.

Among the squadrons of the 10th Group is a tactical reconnaissance squadron which claims a record of having planes up, except for the time spent in moving to and from France in the last war, every flying day since January 22, 1917. Its first combat mission was flown by its commanding officer, a major named Lewis H. Brereton. The unit, then called the 12th Aero Squadron, was in France sixteen months and won battle honors in seven engagements. In 1920 it was designated the 12th Observation Squadron and five years ago it formed the cadre for the 73rd Group, later the 10th, and went to England in August, 1942. It moved to bases in France on July 3.

Present commander of the 10th Group is Lt. Col. Russell A. Berg of Chicago, a big, normally quiet fellow, who is quite articulate on Tac R. He says that it takes months to develop a good recce pilot, to train him to see what goes on, to interpret it and to remember. A good number one man is hard to find, and Colonel Berg sees that a fellow is promoted as soon as he has flown five missions in that position. A lot of fellows moved from number two to number one are shifted right back again when interrogation shows that they have not seen as much as they should have.

"They're up there, by God, to find out what goes on," says Berg. "Not to come back and ask questions." ☆

Answers to Quiz on Page 46

1. (C) Bangkok
2. (D) Jet propelled fighter
3. (C) Maj. Gen. Curtis E. LeMay
4. (A) Burma
5. (C) Personnel Services Division
6. (A) True
7. (D) The main jet is idle
8. (A) Single-engine three-place torpedo bomber
9. (B) 700 miles
10. (A) 11
11. (B) False
12. (B) Oct. 20, 1944
13. (B) At the tip of Manchuria, between the Sea of Japan and the Yellow Sea
14. (B) False
15. (A) True
16. (A) Fairbanks, Alaska
17. (B) False
18. (B) P-39
19. (A) True
20. C-97

THEY'VE GOT YOU COVERED

(Continued from Page 28)

strument letdowns, Oceanic Air Traffic Control at Hawaii directs the B-24 through the overcast to control tower area. When traffic is heavy the stack-up method of instrument letdown is employed. By this system, the arriving aircraft is cleared to a holding level at the top of the stack, while other aircraft are placed in correct landing sequence at set altitude levels below. As the plane holding the lower level is cleared to the tower for landing, each aircraft above it moves down to the next level. A new radio aid, an instrument landing approach system which is now in process of installation where needed throughout the system, simplifies and accelerates blind landing approaches to the runway and contact landing position (see "Shooting Landings by Radio," AIR FORCE, October, 1944).

As the B-24's wheels touch the runway at Hawaii, the tower notes the landing time and passes it along to ATC flight control. A flight completion report is flashed to Hamilton Field, where another uneventful Pacific hop is posted on the operations board.

This same procedure is repeated as the pilot and crew of the B-24 fly from one Pacific island to another.

This description seems simple and routine. Such is the case when everything goes well, when the weather is fair and clear. But when trouble develops, when weather goes on a rampage, radio circuits record drama in the sky. Logs of AACS stations contain scores of such instances.

An operator's cool thinking and his appreciation of his radio equipment saved a B-24 and its crew lost in bad weather over the Aleutians. All but one transmitter was inoperative and no receivers were working. The radio operator set up a continuous sending schedule after reporting his aircraft's identification and radio trouble. AACS D/F (direction finder) stations set to work tracking the course of the aircraft. Bearings were sent continuously to a rescue B-24 dispatched to intercept the lost bomber. A rendezvous 200 miles north of the airbase was effected, and the bomber was led back to safety. Five minutes of gas remained in the tanks upon landing.

Control tower operators at a Caribbean airbase—T/Sgt. Richard Nussbaum, Sgt. Frank W. Pulvino and Cpl. James A. Outlaw—were instrumental in guiding all but one of approximately 50 air transports and bombers to safe landings despite near zero visibility and a violent storm enveloping the base. One plane, not contacted by radio, was lost.

Cpl. Walter J. Kelly, Jr., assisted in landing an AT-6 at night by giving orientation directions to the pilot who was temporarily blinded by a searchlight beam.

In another instance, S/Sgt. William G. Phillips enlisted the aid of antiaircraft searchlight units which used their beams to point the way to an airport for a P-47 pilot.

Although it represents one of the more exciting phases of AACS work, assisting aircraft in trouble rates second in AACS objectives. Providing the service and the means to prevent aircraft being lost, to warn of danger ahead and to expedite the movement of aircraft on military missions represent the major job.

If all these services fail, then emergency assistance is in order.

To do this communications job, the AACS radio team went to Leyte. For the same reason, T/Sgt. Charles Burke and Sgt. Victor Lundy set up their foxhole tower at Myitkyina, Burma, along a rain drenched airstrip that was no man's land. And Capt. Frank Statum and his detachment of 30 men manning a mobile radio station went along with the fast-moving 3rd Army in France to provide radio aid for troop carrier aircraft bringing up maps, ammunition, gasoline and food.

The system which spans such cities and towns as Brisbane, Adak, Natal, Calcutta, Kunming, Naples, London, Paris, Goose Bay and Dayton, handled during August, 1944, over 6,000,000 word groups of weather and operational traffic daily via its point-to-point system. For the month, tower operators logged more than 4,500,000 aircraft contacts.

AACS personnel are classed as noncombatants but they frequently sweat it out within reach of the enemy's bullets. By their work, more planes, more supplies and more men get to the front swiftly and safely via the airways. ☆

Rugged is the word for this AACS control tower at the Tingkawk-Sakan airstrip in Burma.

SNOOPERS

(Continued from Page 20)

after that big naval battle in Leyte Gulf. We'd searched and searched all night long without spotting so much as a canoe. We stayed up there as long as we could, until our engineer said we'd better hit for home unless someone knew of a filling station in the middle of the Sulu Sea."

"And he wasn't kidding, either," said Binford. "I asked Lockwood to give me a heading home. That was off the coast of Palawan."

"Around dawn," added Lockwood. "And that was about when we first picked up the Japs on instruments, just about the same time one of the crew spotted them visually. There was a destroyer and two cruisers. We all had the same thought, 'What a snap for a Snooper . . . duck soup'."

"We didn't have any bombs, remember," broke in Binford. "But that didn't bother us; we were big operators. We'd go in at our usual 1,500 feet, take some photographs and scare the hell out of the Nips and make them change their course."

"Only 1,500 feet wasn't low enough for us," said Lockwood. "No, we wanted real close-up pictures, so we came down to about 700 feet."

"That's right," said Binford with a grin. "And then we had those Jap ships just where they wanted us. . . . Sure they let us have it, like a 4th of July out of hell. We got out of there quick. I guess the laugh was on us that time."

"Might as well tell the whole story," said Lockwood.

"OK . . . Well, we were on our way back home, tail between legs, when we spotted a lone Jap destroyer. A chance for us to save face by scaring the living daylights out of him. That's what we thought. Before we could even turn into him, do you know what the son ——— did? He chased us right out of there."

"That's what you call adding insult to injury," commented Lockwood, adding wistfully, "but if we'd only had a couple of 1,000-pounders . . ."

To celebrate Pearl Harbor day, the Snoopers inaugurated their lone wolf dawn patrols. Capt. Robert D. Wallace, Limerick, Maine, piloted his B-24 through the night to Lutong oil refinery, the next most important to Balikpapan in Borneo. He came in at dawn and made his run on the cracking plant at 100 feet, almost as if coming in for a landing. Then he came back, spotted some storage tanks and strafed them, got eight. Captain Wallace headed for home and sent a brief flash to the commanding general of Bomber Command. "Have some cold beer ready for our return to base." The general had beer ready, a whole case packed in ice.

On the other side of Borneo, there was a dock area at Labuan Town. The tense is correct, for Lieutenant Binford's crew came in, also at dawn, undetected, and made their run at 300 feet, placing a string of gasoline incendiaries the length of the waterfront, with every bomb in the target area. His flash report: "The daylight boys can scratch the target off their schedule. Labuan dock area doesn't exist any more."

Bomber Command admitted that the demolishing job done by these two lone Snoopers could have been approached only by large formations of daylight heavy bombing from high altitude.

The epitome of Snooper individualism, their zeal to do any job on their own, unassisted, is the case of the B-24 piloted by Lt. Jack L. Wagner, of Ventura, Calif.

This Snooper was shot down after a night attack on Truk. All but two of the crew got safely into a life raft after a water landing. The navigator got his position; they headed for their home base, then in the Admiralties, some 650 miles away. As they paddled and sailed, several Jap Bettys flew overhead, but the crew managed to camouflage itself by holding up the blue side of a tarpaulin. They were evidently well camouflaged anyway, for almost daily friendly daylight heavies on the Truk run passed overhead without sighting them. The were doing all right on the 19th day when a Navy Cat spotted them.

The Cat swooped down low and gave them the once over. Their thin, worn faces and short cropped hair must have given them that hungry Nip look, for an observer on the Cat's wing called to his pilot that they were Japs. A side gun was swung toward them, but couldn't quite make it. Meanwhile, Lieutenant Wagner was jumping frantically up and down, shaking his fist and shouting, "If you shoot, damn your eyes, I'll kill you!"

That convinced the Cat, and the rescue was made. When the Navy pilot asked about their experiences, Lieutenant Wagner's only comment was, "If we'd just been left alone down there another six days we'd have made the Admiralties by ourselves."

The Snoopers have quite a few tall stories in their repertoire, including the time they spotted what looked like a ship on the detector and made a bomb run on a waterspout; or the time their plane "jumped" over a mountain in New Ireland.

Tall but true are the stories of their first long over-water missions to Palau and Truk as guinea pigs to see if it could be done. The Snoopers made it, and only then did the daylight boys take over. When enemy fighter opposition took a heavy toll of our heavies on the first Balikpapan raid, Bomber Command decided something should be done about it. That something was for a Snooper, acting as bait, to go within range of Jap detecting devices an hour before the attack to jam them and to draw up enemy fighters.

No, it's no snap to be a Snooper—but if you ask one of them he wouldn't be anything else. ☆

Answers to "How Sharp Are You?"

On Page 2

1. P-38
2. Three
3. Two
4. On his head
5. On belt of man at left
6. Man at right
7. Yes
8. Two
9. Man at left
10. Stand at left

Rendezvous

(Continued from Page 57)

and came out from under the hood for a breather, the lovely fellow in front would shake the stick and say, "Let me have it."

Then he'd let you have it. For the remainder of the period, you'd be subjected to the most stupid, sickening and back-wrenching turns and twists imaginable. All this time while you were in the throes of despair, Walnut Head at the controls was under the impression that not only you were enjoying the flight but admiring his ability. By the time you had landed, you not only disliked this fellow but were ill on top of it all. The most astounding thing about the whole setup was that when you were in the front seat you did identically the same thing as your comrade. The urge to "show off" was just too great.

Until the particular incident which I am about to describe, I had been riding only with my acquaintances. On arriving at the flight shack I noticed offhandedly that I was scheduled to fly with a student with whom I had not flown and did not know.

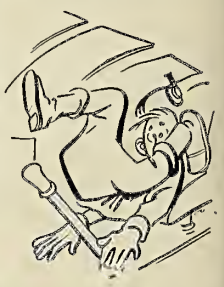
We sauntered out to the ship, and I climbed into the front and he into the back cockpit as per schedule. We took off without incident and, after climbing to a prescribed altitude, my new friend went under the hood and very diligently began to apply his energies to instrument flying. I kept looking at the controls, wondering how surprised the heavy bomber pilot in the back cockpit would be if I were suddenly to wrench the stick back and go into a vertical stall. Oh well, he'd come out from under the hood shortly and then . . .

Shortly thereafter, on glancing into the rear-view mirror, I noticed that the truck driver had peeled back the hood and was looking unconcerned. Now was the time.

I shook the stick gently and said in a bored voice, "Let me have it, old man."

He answered quickly and just as informally, "Sure. It's all yours."

The next second I was in a vertical and pointed toward the base of a fluffy cumulus. Now I pulled up, climbed almost until stalling speed and then fell off on a wing. Very neat. Then for a few vertical turns, a couple of nice wingovers and I knew I had sold him. I looked into the mirror again. He must have been really admiring me. I had never been in finer fettle. For the next few minutes I really gave him my all. Then having exhausted my aerial repertoire and knowing that he was mine, I leveled out.



Then, I heard the click of the mike button very distinctly, and the voice of the back seat driver said very clearly, "Let me have it for a minute, old man."

I then prepared to settle myself comfortably for some dull and level flying.

KERRASH!! My head hit the canopy

and my feet wouldn't go back on the floor. The safety belt was razoring me, and I was trying to grab something with my hands to hang onto but they wouldn't come down below my shoulders. I was being stretched. My ribs were pulling apart. My feet were even with the instrument panel. My knees brushed my ears. The very next instant I was a midget. My shoes were welded to the floor and I thought I was going to have permanent ruptures. My jaw slid down over my chest, and I could look straight out at the top of the stick. At times I couldn't see anything but I don't whether I blacked out or my eyelids just wouldn't come back into place. Verticals, snaps, dives, ups, downs, overs, unders, and, as for describing the other things which occurred, I'm at a complete loss.

Eons later I very faintly heard the mike button click and a voice ask: "Wantta take her in?"

Not being able to find the phone because my vision was obscured by great spots and wavering blobs, I merely nodded my head. I knew he had released the controls but, to allow the ship to descend, I carefully eased back the throttle and gravity did the rest. My hands and feet were shaking so violently from the ordeal that I knew if I handled the controls the ship would start quivering and my passenger would know something was amiss.

How this aircraft ever found the pattern and subsequently landed by itself will forever remain a mystery to me. I had the canopy wide open and was gulping in great lungfuls of wonderful air trying to calm certain internal disturbances.

After having taxied slowly to the line and crawled out on the wing, I stood for a moment waiting for the canopy to slide forward on the back cockpit. Eventually it did, and there was my boy just as calm and cool as a cucumber. I mustered my remaining strength and, leaning forward so he could hear my barely audible whisper, I asked, "What'd you fly, heavies?"

His answer came back snappily, tersely, "No, P-40s, Guadalcanal, 18 months."

I slid off the wing and went weaving off to the nearest latrine.

I don't show off any more.

Capt. Charles M. Davis,
Hq., 2nd Air Force

PICTURE CREDITS

Front cover, T/Sgt. Roger Coster. 10: Signal Corps. 46-47: Boeing. All other photographs in this issue furnished through official Army Air Forces sources. Requests for prints of photographs appearing in AIR FORCE should be directed to the AAF Photographic Library, Headquarters, AAF, Washington 25, D. C.

Shell Game

Stalking the Jap fleet in its lair was the job handed to these six Liberators. Three got back

When the war ends and pilots can sit around swapping yarns about how rough it was over this or that target, Lt. George J. McDowall need fear no man. He has his story. It's the story of his third mission.

McDowall flies a Liberator in the 13th Air Force. A few weeks ago, a formation of six bombers was sent to attack ships of the Japanese Navy in Brunei Bay, Borneo, and McDowall was in the No. 6 spot.

Ten miles from the target a Jap battleship of the Kongo class began shelling the formation with its heavy guns. Huge sheets of flame enveloped the ship each time it fired a salvo. Then, from all the big ships in the harbor, came the barrage—silvery incendiaries, rocket missiles, purple, orange, red, yellow and blue puffs of antiaircraft, and bursting phosphorous shells.

The formation staggered on to the target. No. 1 was hit and went down in flames. No. 2 had to feather an engine. No. 3 began to smoke and went in after making its attack. No. 5 blew up in the air. No survivors were seen.

Suddenly McDowall's plane rocked and bucked from the impact of a thundering six-inch shell from the battleship below. The plane was tunneled from bomb bay to tailpiece. Entering at the front bomb bay, the shell ripped out guns, exploded oxygen bottles, tore out interphone wires and gashed the horizontal stabilizer. Luckily the shell was equipped with a time fuze and it did not explode.

While the plane was still on the bomb run, and with a strong wind whistling through the hole made by the direct shell hit, a Zero came nosing around from six o'clock low. A job for the tunnel guns. Sgt. William R. Bogart, who fortunately had been in the waist when the shell struck, hurried to his guns only to grab the shattered remainder of the azimuth ring which once held them.

On its way through the Liberator, the shell had set off a box of .50 caliber ammunition. These bullets became an added hazard. Sgt. Richard W. Finch, right waist gunner, was hit but he still manned his guns with a .50 caliber fragment sticking in his neck.

Phosphorous shell explosions directly ahead of the plane had nearly blinded the bombardier, Lt. Frank E. Turner, but his bombs, along with those from the remainder of the formation, bracketed a cruiser, scoring direct hits amidships and leaving it smoking and sinking. Lt. Robert L. Stewart, the navigator, stood between the pilot and copilot during the attack doing all the praying for all the crew and earned himself the crew's subsequent designation of Deacon, First Class.

As the bomber flew through the fierce and colorful barrage, Lt. Seldon C. Vaughn, the copilot, became so fascinated and preoccupied with the showy Jap fireworks that he accidentally let the rpm run up too high and had to spend the time over the target adjusting the propellers so they would synchronize again.

One of the lesser items of damage in the plane was the puncturing of the crew's only can of tomato juice and, as they munched a dry lunch en route home, this made them madder than anything else.

McDowall, afraid the great holes in his B-24 might cause it to buckle when it hit the runway, ordered the entire crew forward for the landing at the base. But there was no need to worry. The Liberator rolled to a perfect stop.

S/Sgt. Martin Boyajian was waiting at the field. For months he had sweated over that Lib and after taking one look at the damage by Jap shells, he shrugged with a true crew chief's resignation and said, "Well, it was a good ship once, anyhow."

McDowall apologized. ☆

This B-24 blew its top when flak burst in waist section during mission over Yugoslavia. The shell blew out both guns, severed the rudder control cables, killed one gunner. Pilot guided the Lib home using only the engines.

Marauder at left gets pasted in belly by flak burst that killed bombardier, seriously injured a gunner. Despite severe flak damage the B-26 succeeded in dropping bombs on target and returned to base.

GI ingenuity saves the day for a B-24 whose hydraulic system was ot over Germany. Parachutes released through the waist windows of tl b less Liberator, just before the wheels touched, effectively slowed d

Riddled with flak holes sustained on a mission over Debreczen, Hungary, this B-17 almost split in two when its tail wheel gave way during lan ng one was hurt. Test flights show B-17s have enough extra strength to carry bombs under each wing and this bonus helps when bomber is ip

The next time you are sweating out a mission home, ubbing your rabbit's foot and nervously eyeing a flak-chewed engine, remember that in addition to the l powers of the rabbit, you also have the talents of the esign engineer on your side. Basic precept of design and ction of AAF planes is that they shall be rugged, rugged to keep flying after an engine is shot out, a wing tip off, a stabilizer shattered, a wing or fuselage burned h.

t's more, considerable extra strength is built into the e to help it weather the wear and tear of combat ma-s, the buffeting of gusty air, and the strain of taking action. This extra strength enables the plane, even when damaged, to maintain straight and level flight.

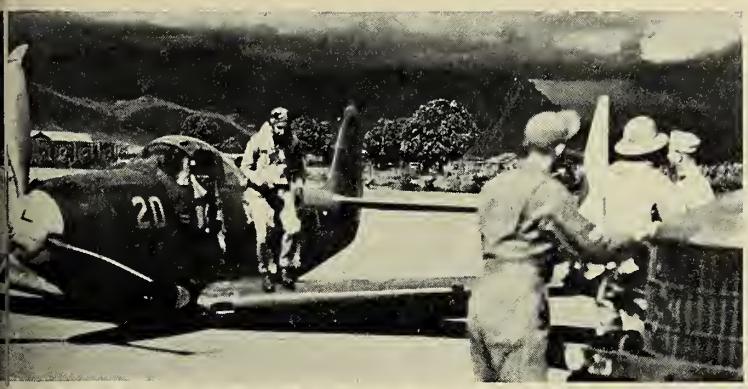
ddition to ruggedness and design safety, all of our rs are required to have systems of duplicate controls so e set can be used for flying the plane when the other out. Many planes have had all manual controls knocked t have returned safely on the auto-pilot.

provision for prop-feathering, to prevent windmilling ere vibrations that might shake a plane apart, has saved erable planes when a shell has hit the powerplant. Fire ishing systems that automatically fill nacelles with CO_2 engines catch fire, also enable many a wounded bomber rn home instead of burning up in the air.

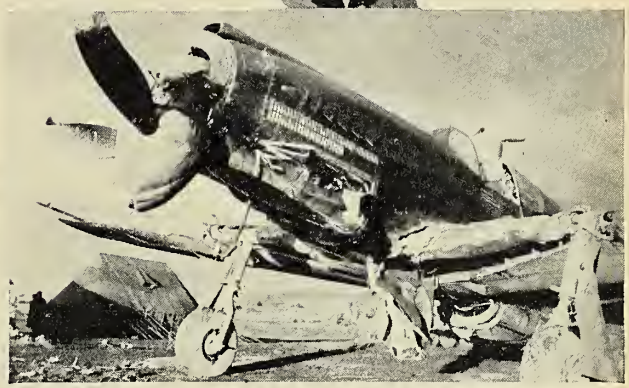
despite all the planning, it often takes a little something o get the old crate home—some slick piloting or a quick job or just a happy inspiration from a GI noggin.

han Lucky

This B-17 literally got its tail chewed by Nazi fighter planes using rocket shells. The tail gunner was blown out but parachuted safely. The Fort got back and landed in this condition.



vid Straub steps blithely from his P-39 after successfully pancaking n a mission in the South Pacific. Fighter planes are given extra rugged or occasions like this when the plane is subjected to severe strain.



Looking like some weird insect whose neck has been broken, this battle-damaged P-51, veteran of 63 missions, was landed by its pilot at an airfield in the Mediterranean theater.

tor with wing and engine blazing, gets fast, expert treatment from crash crew at base in England. Five ME-109s jumped the B-24, puncture with 20 mm burst and knocking out the hydraulic system. Tail gunner got one ME, found forty 20 mm holes in his turret after landing.

SHOOTING THE BREEZE

GOT ANY GOOD STORIES? SEND 'EM IN!

Italy. S/Sgt. Norman B. Fishman, a Liberator gunner, found many things which irritated him in the Army. Basic was no bed of roses, gunnery school was worse, and when Fishman began combat flying his irritations became almost unbearable. Yet, he hung on, month after month, and was awarded the Silver Star, the Distinguished Flying Cross, the Air Medal with four clusters, and the Purple Heart. But he was still irritated. The Army was getting under his skin. One day Fishman was examined by flight surgeons, and suddenly he found himself honorably discharged. The order for his release read: "This man cannot wear Army clothing. He is allergic to wool."

England. In the old days when the boys were flying unescorted missions over the sub-pens at St. Nazaire, the Germans used to experiment with colored flak. They tried pink, brown and black in interesting variations. One Fortress group found it advisable to give green navigators a little aging before assigning them to a crew. On one trip, when a new navigator was making his first flight, Jerry threw up a curtain of ack-ack which the navigator mistook for an unusual cloud formation.

"Ah," said the youth over the intercom, happy to make himself useful, "that's fractocumulus. When you see those clouds below nimbostratus, trouble is brewing."

With fine restraint the others kept silent. A few seconds later an accurate burst exploded much too close to the bomber.

"And that," said the pilot nervously, "is flak forming on the wing!"

Romania. When American prisoners of war, mostly airmen, were liberated from Romanian POW camps, the Germans came over and began some intensive bombing. T/Sgt. Thomas J. Murphy, newly released POW, found the bombs dropping uncomfortably close and took refuge in the first building he could reach. He found some stairs leading to a dark basement apparently filled with empty boxes. He crouched down among the boxes, which rattled every time a bomb exploded, and waited for his eyes to grow accustomed to the dark. A few minutes later some of his buddies, who were hiding in a bomb crater in the street, saw Murphy come flying out of his shelter and start running down the street. They hailed him and he landed in the crater with his eyes like saucers.

"What's the matter with you," one of the guys said. "Don't you know enough to stay in a shelter in a raid like this?"

"I prefer the bombs," chattered the harassed sergeant. "That damn place is a storehouse for coffins!"

USA. Classified ad section of *The Rattler*, newspaper of the AAF base at Pyote, Texas, carries this dark announcement: "Whoever swiped my girl's picture out of my foot locker, go ahead and keep it! She hasn't written me for two months anyway. You'll be sorry. Pvt. Herman Gladzack."

Scotland. A fighter pilot stationed in Scotland had a problem so he went into a pub to drink it over. There he found a Gordon Highlander with whom he struck up a fine alcoholic friendship. When they both finally weaved out of the pub, still clutching the glasses that contained their last drink, they found that it was raining. Immediately, and somewhat to his annoyance, the American found himself hustled along at what seemed unnecessary and undignified speed.

"Whoa, whoa!" he cried. "Who minds a little rain. What if we do get wet?"

"Whisht, mon," said the Scottie, "it's no ourselves I'm thinkin' of. I just dinna want all this water dilutin' my drink!"

Burma. A couple of glider pilots, one from Boston and the other from New Haven, who had landed with airborne troops behind the enemy lines, found themselves all alone and defending a road block that cut off the last Japanese line of retreat. A fairly strong enemy patrol had tried twice to break through. The glider pilots had driven them back with a hail of tommy-gun fire, but now ammunition was running low.

The Jap survivors reformed and launched a suicidal "Banzai" charge. The Americans shot them all down except one. This one, an officer, came straight up to the barricade brandishing his sword.

Three feet away, he halted and screamed, "Go to hell, you beasts, and to me at once all surrender. If not shall horribly die all the Yankees!"

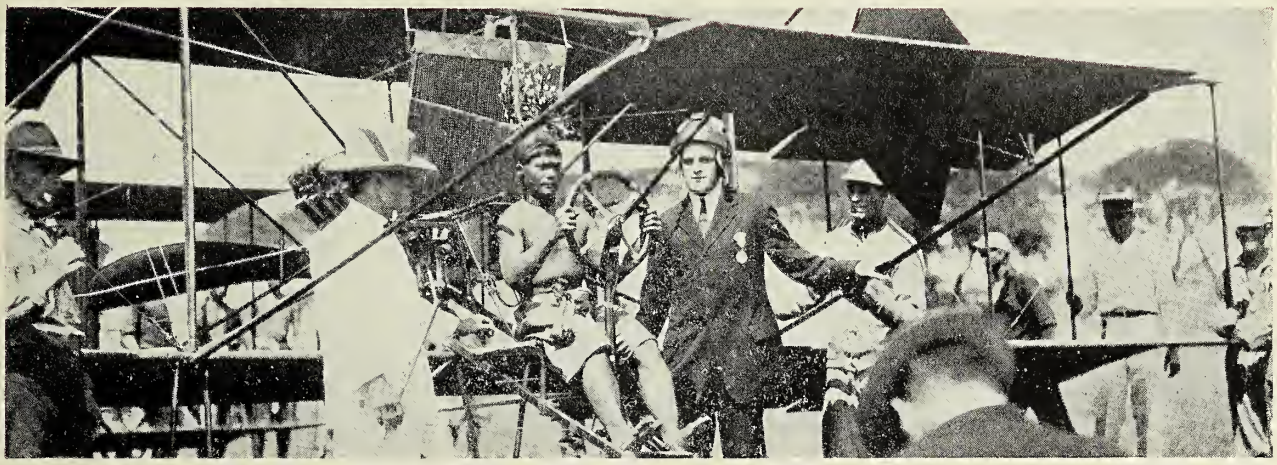
One of the glider pilots—the one from New Haven—calmly shot the officer through the head with his last bullet. Then he turned to his companion and commented:

"That'll teach him to go around talking like a Harvard man."

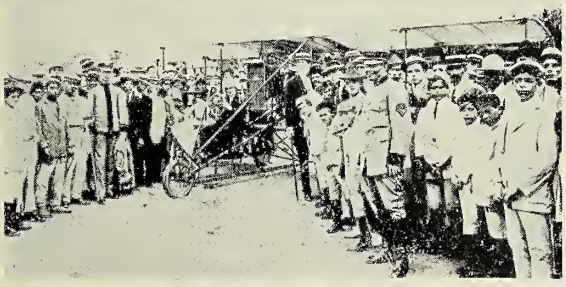
India. A colonel had a general for a boss, which is not uncommon in the Army, and whenever the general asked him a question, he infallibly replied "Yessir," which is not uncommon either. One day when the general was away on a trip, and everybody knew it, the colonel happened to leave his office door open. He was sitting at his desk, happily engaged in checking some list or other with his secretary. The girl was pointing out items on the list and the colonel was giving his concurrence to each item by saying loudly and monotonously "Yes, yes, yes, yes, yes." A corporal in the outer office resisted temptation as long as he could, then yelled loudly, "Keep the general on the phone, colonel; I wanna talk to him!"

So far the corporal has retained his anonymity and consequently his stripes. ☆

THE ALBUM



1910, Manila. Big Chief Keep-Um-Feet-On-Ground got talked into this photo by Pilot L. Hammond who is shown with helmet and medal. The Chief, who got his primary in a BT 57 Ox Cart, will probably fly by the seat of his pants.



1911, Puerto Rico. Lincoln Beachey made a big hit with the bobby sox crowd when he exhibited his Curtiss biplane at the Insular Fair at San Juan. Nobody swooned.

1916, Mexico. Maj. H. A. Dargue, who just landed as part of the Punitive Expedition, holds off the stone-slinging citizenry by posing for photograph for two hours.

1918, France. Hot pilots of the 11th Aero Squadron do a little collective mugging for the photographer. The boys used Jiggs with a bomb under his arm for their insignia and together with five other squadrons, participated in 215 raids.

thanks, Sucker
Is this Nazi talking to you? When you fly over enemy territory, don't carry ANYTHING that reveals your unit. Violation of this security rule plays right into the enemy's hands. It endangers your friends. It may cost their lives!

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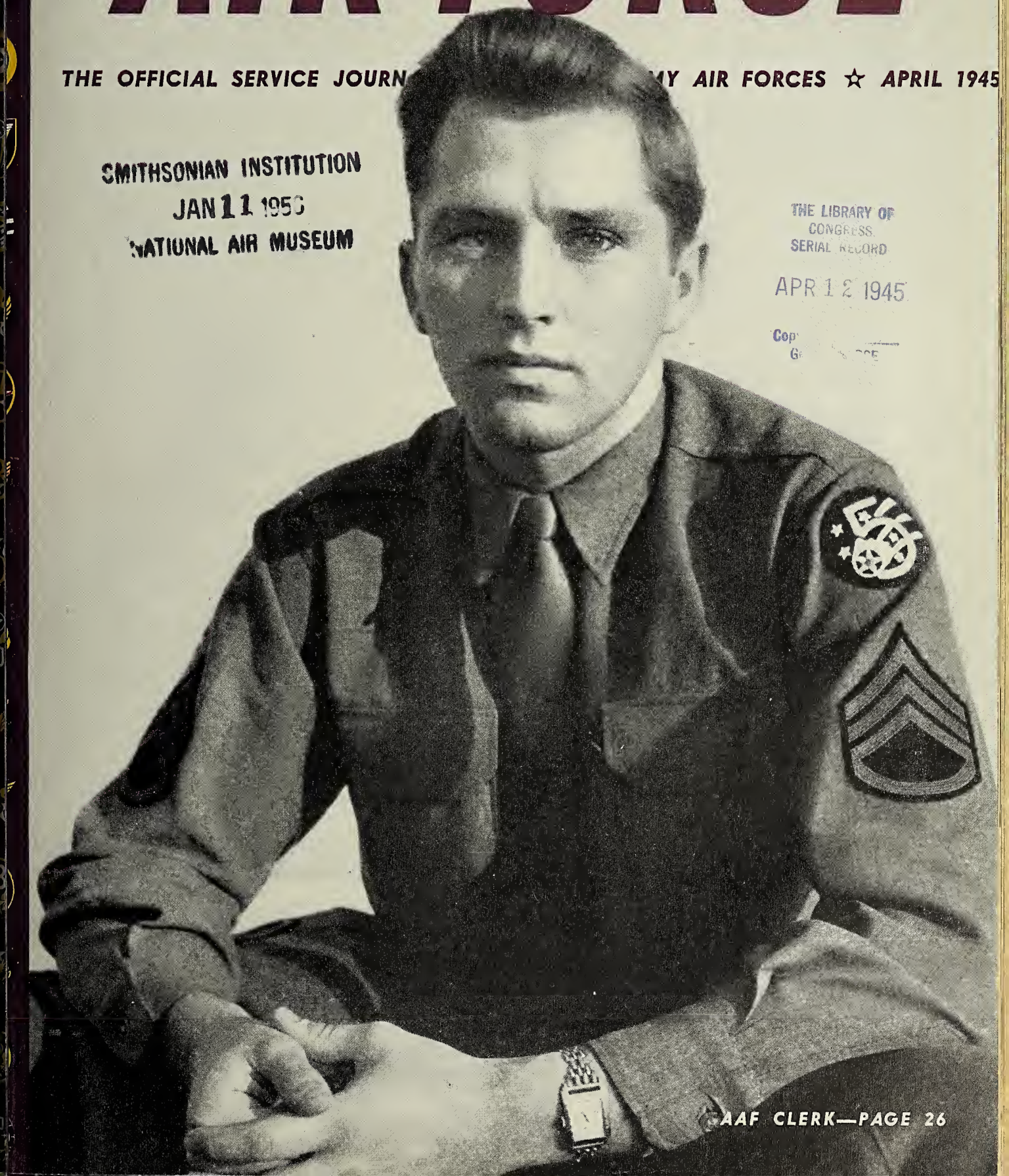
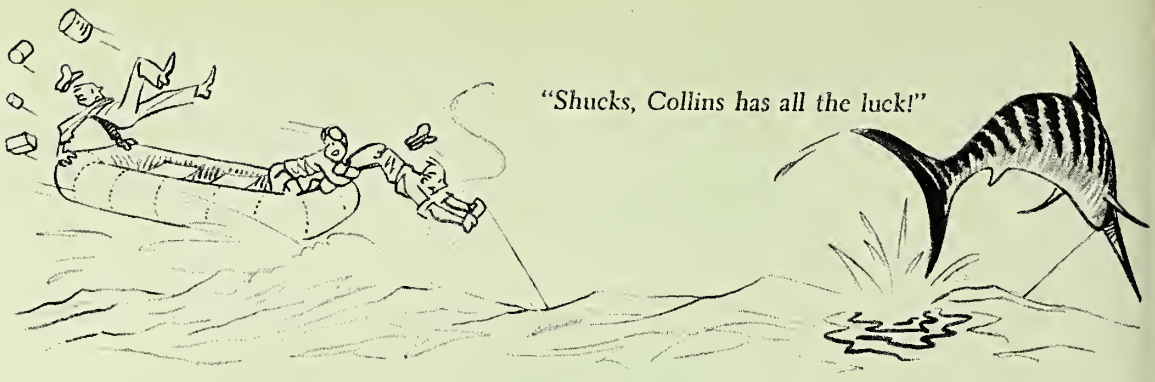


AAF CLERK—PAGE 26



"Shucks, Collins has all the luck!"

SURVIVAL

by CAPT. WM. T. LENT

"Dreadful news, your majesty, a rescue party is on its way."

"It says here, 'Wild game is most plentiful and easiest to find near water!"

"Weren't we lucky to have that personal equipment officer aboard?"

Rendezvous

Black Bread and Calvados

Dear Editor:

On Page 18 of your December issue, there's a handsome two-color reproduction of a photograph. The caption reads: "Flaming debris of exploding Nazi ammunition truck fails to stop 8th Air Force Thunderbolt during strafing mission over France."

Thanks to that caption, the PRO Section of XIX TAC has been thrown into the guard house and put on a diet of black bread and calvados, and I'm writing to you in an effort to get us out.

The guy in that airplane was Capt. Thomas R. Walsh, a Thunderbolt pilot from our 406th Group. He destroyed that ammo truck on 23 June 1944, and the picture you reproduce was enlarged from a 16 mm frame in XIX TAC Combat Film Number 2754.

I'll agree with the world that the 8th Air Force is a nice little outfit; but they've done enough good work all by themselves to get along very nicely without having people give them credit for our work. . . .

Capt. Roger C. Williams, APO 141.

The PRO section of XIX TAC is blameless. The fault was ours. Captain Walsh is a pilot of the XIX Tactical Air Command, 9th Air Force. Incidentally, the photo was taken by Lt. Wille L. Whitman, his wingman.

Note to Captain Williams: we'll send you some white bread if you'll send us some Calvados (an unforgettable form of French applejack).—Ed.

Not So Sharp

Dear Editor:

"How sharp are YOU?" In the February issue you answer question No. 5 on Page 9:—"There is a fire extinguisher and mirror on the jeep."—True!!! The fire extinguisher is under the dash, Bub. That's a gas decontaminating apparatus mounted on the fender. So help me!!

Capt. Walter Klein, MC
Ashford General Hosp.

You and a lot of other gleeful critics are correct. The so-called "fire-extinguisher" is a Decontaminating Apparatus M-2. We are thinking of using one on our quiz expert.—Ed.

Strange Phenomenon

Dear Editor:

In the "Plane Boners" department of the November AIR FORCE there is, I think, a big mistake.

The article is headed, Cincinnati, Ohio, and tells of a P-39 pilot whose engine was on fire. He bailed out and was burned severely.

Your comment was that he would have escaped the burns if he had released his safety belt before jettisoning the cockpit door, for the flames from the engine were sucked in the cockpit.

If this is true, the plane must have been going backward at the time. How else could

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THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

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How Sharp are YOU?

An imaginary two-bits says you can't answer correctly all the questions you will find on Page 45 after looking at this photo for 60 seconds. Score 10 for each correct answer. 100 is perfect. If you do make 100, remember the two-bits is only imaginary.

HOW SHARP ARE YOU? Turn to Page 45

Rendezvous

(Continued from Page 1)

the flames get to the cockpit which in all P-39s I have ever seen or heard about has the engine to the rear of the cockpit separated by a firewall?

Please give me an explanation of this strange phenomenon which induces flames to buck at least a 100 mph headwind and burn our pilots.

1st Lt. Edward G. Ready, APO 210.

In a P-39, jettisoning the door while in flight creates a cyclonic action of air in the cockpit which is powerful enough to suck flames from the burning engine into the cockpit from around the armor plate or firewall. With the engine behind the pilot, as it is in the P-39, this hazard is far greater than it is in airplanes where the engine is ahead of the pilot. Also see "Fire-Fighting with Hatches" on Page 52 of this issue, an article on the same general subject.

Who's Yehudi?

Dear Editor:

I have just missed my first "How Sharp Are You?" and lost a bet. It was the January issue. You say there are only three men in the picture.

Who belongs to that hand, background left, Yehudi?

S/Sgt. Ré Atchison, Dallas, Texas.

Our photo retoucher says the hand was quicker than his eye. Credit us with a technical error.—Ed.

In Defense of "Rocketry"

Dear Editor:

Your pithy comment regarding my terminology in my letter concerning "rocketry" compels me to present an explanation in defense of its use.

First, may I state that a new field of endeavor of necessity creates the terminology to describe its activities. And, as you well know, the terminology of science is not, in its formative years, prone to widespread, common usage.

As far as finding "rocketry" in your dictionary, that fact does not condemn the word as being non-existent (except in my mind). Consult the fifth edition of "Webster's Collegiate Dictionary"; on Page 873 we find that "-ry" is a reduced form of the suffix "-ery." On Page 339 we find as one definition for the suffix "-ery": "Act, art, trade, occupation, or the like, as in archery". Thus we have a sound etymological basis for the word "rocketry", the science of reaction propulsion.

In like manner, a rocketeer is a man concerned with rockets and rocketry. And so on ad infinitum.

Robert M. Gordon, Las Vegas, Nevada

Thankery. Brooding over your letter, we ventured gingerly into this etymological realm last month, using the word "jeepery" in In This Issue. Now we're wondering if that makes the men who drive jeeps—jeepers—Ed.

Only One Giant

Dear Editor:

I just came across a copy of the December issue, which contained, I think, a new feature—The Album.

Shown on the page was a front view of a large German World War I Bomber, labelled a Zeppelin. Actually, this ship is the Siemens-Shuckert R-VIII, the largest ship built during the war. Some figures on it are:

Span 48 meters (157'); weight 38,500 lbs; speed at 10,000 feet, 80 mph.

An interesting feature of the ship was the power arrangement. It had six 300 HO Basse and Selve engines mounted in the fuselage, driving four outboard mounted propellers, two geared to each of the four blade pusher props, and one to each of the two blade tractors. To my knowledge, only one of these giants was built.

If contributions are accepted from readers, please consider the enclosed. It is the German Junkers D-1 of 1918, a fighter that was about 15 years ahead of its time. It was put into production, however, and gave a good account of itself. Power was a 160 HP Mercedes . . . .

I have a very extensive collection of old airplane photos, including many oddities and freaks. I will be more than pleased to send you samples of them from time to time if you think that you can use them. I'll have to send back to the states to have my wife print them, but that will be the only inconvenience.

1st Lt. Peter M. Bowers, APO 671.

Thanks for the correction and offer of more pictures of this kind. We'll be glad to see yours or any other reader's collection.—Ed.

Information File

Dear Editor:

It is suggested that an Engineering Officer's Information File be adopted by the Air Forces. Such a publication could be similar to the Pilot's Information File with information of both technical and administrative nature that pertains to Air Force engineering officers. Such a publication would be of value to both engineering officers and mechanics.

1st Lt. Robert S. Sandifer,
Warrensburg, Mo.

Good suggestion. OFS says such a file is already under consideration. Flight Engineers' Supplements are also being considered for use with the Pilot Training Manuals for tactical aircraft.—Ed.

Midget Navigators?

Dear Editor:

The following is quoted from an article by Maj. Luther Davis entitled "The B-29 and You":

"The navigator has a good place to work and a very complete set of self-computing, handy gadgets; an astrodome he can really get a sight from."

With reference to the above quotation,

(Continued on Page 46)

In This Issue

The clerk on the cover of this issue is S/Sgt. Robert Gable of Mt. Penn, Pa., back home after two years on the other side of the Pacific. Our staff photographer took the picture at Redistribution Station No. 1, at Atlantic City, which accounts for the wool shirt and neat tie. Most of the time overseas Gable looked as he does in the photograph on Page 26. Gable went into the Army two days after Pearl Harbor. He was a private until the summer of 1943, a corporal until the end of that year. He went overseas May 18, 1942, clerked at Headquarters USAFIA, Melbourne, served three months with the 19th Bomb Group at Mareeba, then was assigned to Headquarters, 5th BOMCOM, and moved up with them from Townsville, Australia to Port Moresby and Nadzab. No brass bands played when Sergeant Gable came home. His home town paper carried no story. But as Maj. Luther Davis points out on Page 26, without the thousands of Sergeant Gables in the AAF, we wouldn't be winning the war.

☆

Maj. Karl E. Volding, in charge of the Far East Air Forces' Convalescent Training Program (see "Return to Combat," Page 18), claims that for the Jungle Brook Golf Course he brought into New Guinea the first golf balls and golf clubs in its history. Another activity promoted by Major Volding among the convalescent patients was study courses. When one of the patients asked for his help with a stickler in an arithmetic course he was studying the major was more than glad to cooperate. He was stumped and a bit embarrassed, however, when the "arithmetic" turned out to be an involved problem in integral calculus.

☆

Capt. Larry Bachmann, our correspondent in India who wrote "The B-29—Modified by Battle" on Page 6 is having a prolonged love-affair with the Superforts. He writes constantly that it's above comparison with other bombers, and Larry has flown missions in most of them. "The flight engineer," he reports happily, "sits in front of a lot of instruments and handles them like Jessie Crawford at the Wurlitzer and the pilot turns a knob and the plane gyrates like a swan in one of Disney's shorts. . . . There was a mission today but it was very tame and mild. They split the groups up. One half went on a short mission of 13 hours and the other half on a milk run of 11 hours. Nothing much to report on it."

☆

Speaking of food on Leyte, Maj. Herb Johansen who was there and who dug up most of the facts on "Foxhole Medics" on Page 30, has a sad tale to tell of what happened last Thanksgiving Day. There were some advanced combat units who were isolated in western Leyte in close contact with fiercely fighting Japs. The Americans had been living entirely on K-rations, and their comrades at Tacloban were determined that they shouldn't miss the AAF's traditional Thanksgiving dinner. So turkeys were roasted and fixin's prepared and C-47s took off to drop them by parachute in the combat area. An ill wind upset the plan, however, and the feast fell behind the Jap lines. One GI said later that he didn't mind missing Thanksgiving Dinner too much. The thing that burned him up was listening to the Japs crack the turkey bones. He said they were that close.

Actually, the boys in the C-47s were not to blame. When they could see their target, they could usually hit it on the nose. But the almost hourly changes in the tactical situation in that area, with hills and valleys constantly changing hands, caused many similar mishaps. The risk had to be taken, however, because often there was no other means of getting food to the forward units. In fact, the story goes that the Jap radio once beamed a complaint to the American quartermaster asking him to change the menu, as the Japs had run out of recipes for spam.

☆

One of the best read features in AIR FORCE, according to all the surveys, is "This Is Your Enemy," which can be found this month on Page 14. It's about time some credit was given to the anonymous compiler of these pages and the artist who illustrates them. Responsible for the copy this month was Capt. Harry H. Ransom of our Washington staff. He digs through endless reports, selects the most interesting and informative items he can find, and shepherds the final compilation through clearance—no easy job. The illustrator is Cpl. Lou Glanzman, one of our most versatile staff artists, who combines good draftsmanship with fine artistic qualities and a deep understanding of people. He is responsible for the cartoons in Shooting the Breeze (Page 64) and has a hand in the art work on various other pages. He got married the other day, but so far it doesn't seem to have hurt him much. If anything, he draws faster.

☆

The foxhole medics whose activities are described on Page 30 lived up to their name even when asleep. During the almost continual and heavy bombings in the early Leyte days, catching even a few hours sleep at night was all but impossible. Maj. Wilfred E. Rugierro and his staff, however, installed hospital litters in their community foxhole, and, sleeping in relays, managed to get in a few hours much-needed shut eye. Another evidence of their ruggedness is that during one of the worst typhoons to hit Leyte, while other units were eating K-rations, the field kitchen of the 29th Portable Surgical hospital continued to function and even baked a batch of blueberry pies. ☆

All the Answers

In simulated combat, AAF Proving Ground Command paves the way for some of our most effective aerial strikes against the enemy

BY MAJ. ROBERT V. GUELICH
AIR FORCE *Staff*

In December, 1943, six months before the Nazis launched their first V-1 robombs at London, the AAF Proving Ground Command was tossed a hot potato. Intelligence knew that scores of robomb installations were being constructed in Holland, Belgium and France, and that they all were pointing toward London; they knew the number of buildings, and had all construction details. But neither the RAF nor the AAF had been able to destroy the reinforced concrete units.

Assignment of the Proving Ground Command was to build a duplicate robomb launching site, buildings to be made of reinforced concrete three feet thick, and develop a bombing technique that would destroy such installations.

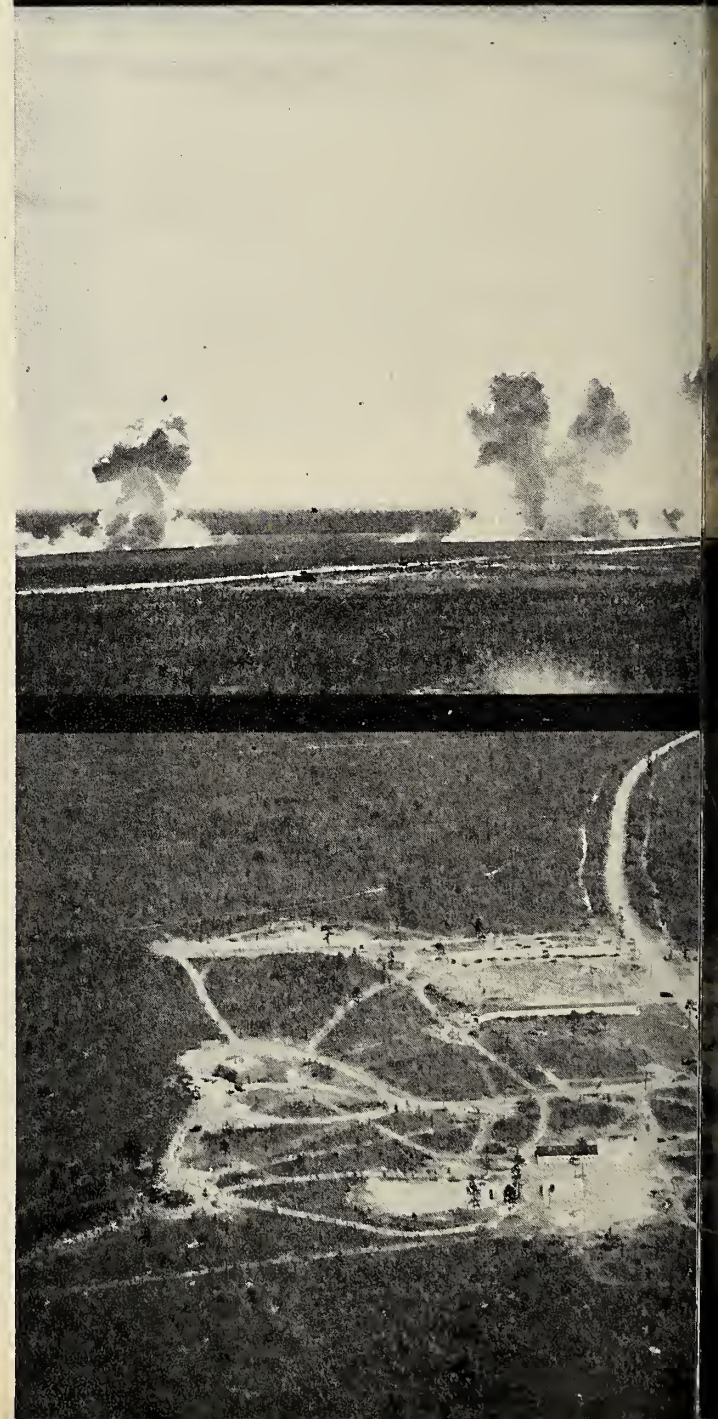
Twelve days later one complete installation and two extra sets of important component buildings were completed. In two more days, the engineers had completely camouflaged the site and several antiaircraft batteries had moved in to defend the target against anything the AAF might dream up.

Then, the bombers and fighters threw everything they had at the rugged structures—bombs, rockets and cannon shells with instantaneous and delayed fuzes. More than 400 attacks were made from 30,000 feet down to ground level with B-17s, B-26s, B-25s, A-20s, P-38s, P-47s and P-51s. Every time the airmen thought they had solved the problem, the ack-ack boys would check in to report the planes had been sitting duck targets.

Finally, the fighter pilots found the weak spot of such an installation and, in the presence of General of the Army Arnold, they blew the installation to bits and were out of sight before the ack-ack could touch them.

With reports and motion pictures in his hands, Lt. Col. D. G. Hawes of the Proof Division's Bombing Section, then

(Continued on Page 59)



PROVING GROUND

Eglin's proof-testers constructed a simulated Tokyo on one of the bombing ranges and conducted a series of tests to determine what type bombs would be most effective against installations of the real Tokyo. Photo at left was taken 30 minutes after an incendiary attack on the Eglin Tokyo; fire-fighters could not check the blaze. B-29 crews bombing the Musashina Tokyo plant, at right, used information from Eglin.

BATTLEGROUND

PROVING GROUND

Bomb experts at Eglin have experimented with attacks on all types of targets and from many different altitudes. Photo at left was taken during test of bomb spacing. Another neat spacing job is shown at right, accomplished by the 5th Air Force in its three-day attack upon the Jap airfields on Hollandia. Using bombing techniques that surprised the Japs, B-24s, B-25s, A-20s destroyed 284 Jap planes on the ground.

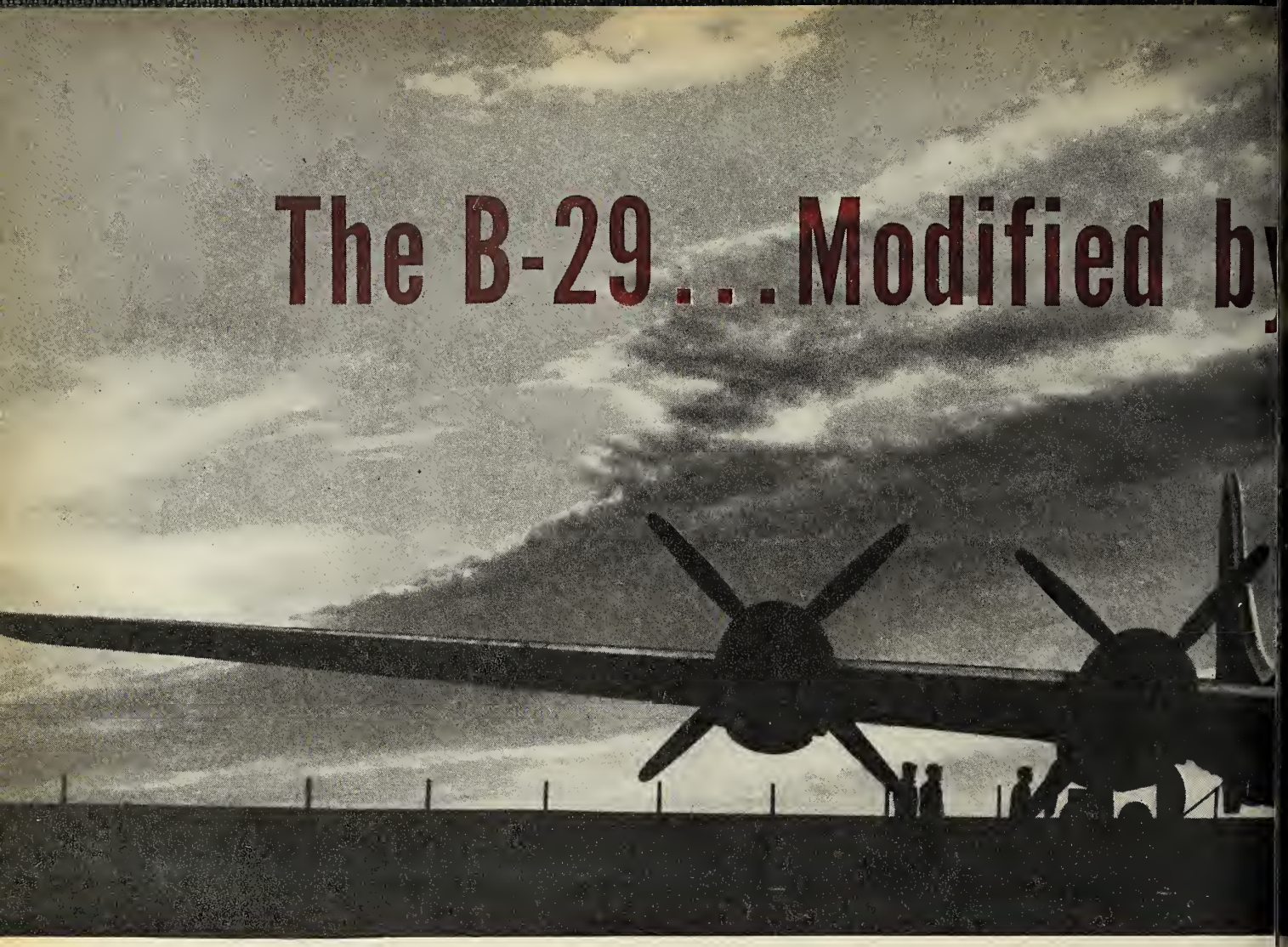
BATTLEGROUND

PROVING GROUND

Eglin's big job in December, 1943, was to find out how Nazi robomb emplacements could be knocked out. Launching site with buildings of reinforced concrete was constructed, camouflaged, protected by antiaircraft. More than 400 attacks with variety of bombs and aircraft had to be made upon the site before the solution was found. Nazi site at right gets a taste of the Eglin technique from the 9th AF planes.

BATTLEGROUND

The B-29...Modified by



BY CAPT. L. P. BACHMANN

AIR FORCE Overseas *Staff*

Two B-29s, traveling in opposite directions, passed each other in the skies over Africa. They looked identical. But the plane headed for home was one of the original Superfortresses that had gone overseas with the 20th Bomber Command a year ago. The plane headed for China and combat was a new, improved B-29—the ship which had resulted from that year of sweat, blood, grime and guts, from the practical experience of the men who first took the Superforts into actual operations. It was a B-29 modified, as all military planes must be modified, by battle.

When it began operations, the 20th Bomber Command had for its essential mission the strategic bombing of Japan. Also, it was charged with supplying itself across the Hump, the worst air route in the world. Although aided in this by 18 C-87s at first and then by three squadrons of C-46s, as well as ATC, men of the 20th had to fix up their new planes as tankers and learn more about them through such transport operations.

They were required, further, to operate in a climate where the heat inside the airplane, even while flying, sometimes went up to 150° F. Men on the line burned their hands whenever they touched metal exposed to the sun.

The 20th had to work out new tactical methods of operations for a bomber that was faster and heavier and flew higher than any previous tactical airplane.

Flight and ground crews of the 20th were to learn many things—that bombs drop differently under these extreme conditions, for example, and that fuzes arm the bombs in a different manner at the B-29's heights and speed. But that was to come later, after the first major problem was licked. That problem was the new bomber itself.

The B-29 was like the Genie of the Arabian Nights. It had to be harnessed. Like Aladdin, the 20th Bomber Command was given something with a few strings attached. The Command had to contribute something, too. The plane was as nearly perfect as it could be made on paper. But planes are not flown on paper. It was only through experience that the Superfort could be shaken down and the bugs eliminated. Flyers, engineers, above all, the ground men, made enormous contributions, as may be witnessed by the improved B-29, which carries twice the bomb load of the original plane and is better in virtually every other way.

The greatest problem in the B-29 was the engine. The airplane or frame has always been highly satisfactory. There is no doubt that the engine, too, would have proved itself had the plane been used as originally planned. During the training period in the U. S., the Wright engines had functioned without difficulties. But the use of the Superfortress was changed when it went overseas. It was required to carry excessive fuel and bomb loads on operational and combat missions. The engines began failing because of the progressive over-burdening to which they were subjected.

But the pilots and flight engineers concede that they did

Battle

The men of the 20th Bomber Command were pioneers in eliminating the bugs from our biggest bomber

not fully understand the characteristics of the new plane. They were not getting the most out of it. They were like a young fighter awkwardly using a right hook which eventually would develop into a knockout punch, and since there was no time for major engineering changes, they met most problems by different methods of operating procedure.

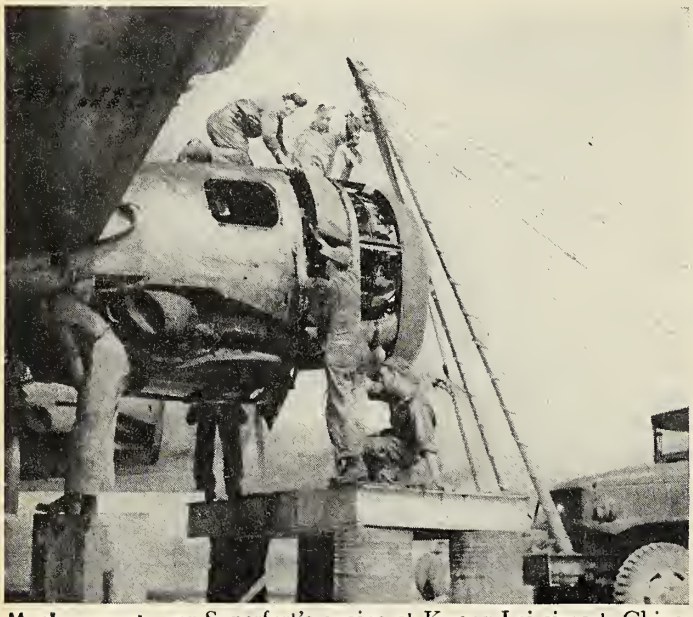
At times, the groups comprising the 20th Bomber Command operated off airdromes where the ground temperature was over 120°F. This was an outside temperature in excess of the maximum carburetor air temperature for the engines themselves. It caused the Wright engines to act like overworked mules and sometimes they balked. It is estimated that when the cylinders are overheated the engines produce 200 horsepower less than under normal conditions. One way this could be overcome was to take off while it was somewhat cooler, generally between 1700 and 0900 hours. Another method was the obvious one of shortening the period of running the engines up before take-off. That meant speeding up the period between engine turn-over and take-off. Without eliminating any part of the check-list, the crews cut this time in half. It was soon discovered that the spark plugs fouled when the engines were run at a low rpm. This forced the bomber to taxi at an rpm which heated the engines over the danger point. Other spark plugs were quickly procured.

At first, the greatest operational strain put upon the B-29s was that of flying the Hump carrying maximum loads, generally of gas. Designers of the bomber had anticipated such tonnage but had figured that the planes would fly low for the first hours, gradually rising to altitude as fuel was consumed and the plane became lighter. But in flying the Hump the Superforts had to climb immediately above 20,000 feet. They could not fly lower even in clear weather because of heavy ATC and other traffic below them.

One of the important operating procedures that had to be learned the hard way was the relationship between airspeed, cylinder head temperature and cowl flap setting. The plane's designers figured it out and made the settings but they knew these were approximations. It was up to the flyers to get accurate information quickly and to pool their findings.

In the early days, the pilots got trapped into the vicious air cycle of getting their engines on the wrong side of the power curve. An example of this is a bomber flying at ideal conditions of about 200 mph. The cylinder heads are at a normal temperature; the cowl flaps are closed. Then the flight engineer notes that the temperature has increased by 5° F. in the engines. He opens the cowl flaps three degrees to get more air and off-set the increase in temperature. This greater wind resistance causes the speed of the aircraft to drop. The pilot notices this and is forced to increase his power. This in turn causes the engines to get hotter. And the engineer, in turn, opens the cowl flaps wider, thus causing the plane to slow down even more.

The way out of this obvious method of causing the plane to stall is for the pilot to dive the craft and get it on the "step." The step is that position of an airfoil at which the airplane flies the fastest at the least power output. As the bomber regains speed the pilot reduces power and closes the cowl flaps. The increased airspeed and lower power cools the engines, and the bomber is back on the correct side of the power curve. This fine balance was



Mechs sweat over Superfort's engine at Kwang Lai airport, China.

Great clouds of smoke from Showa Steel Works furnish backdrop for B-29's engine during daylight raid on Anshan, Manchuria.

one of the most important lessons learned by the early crews of the B-29s.

During this period the engineers in the United States were far from idle. As fast as they got reports of difficulties they worked out new means of overcoming them. To help keep the engines cool, the cowl flaps were shortened. This also allowed the now larger openings to be exposed even when the flaps were closed and permitted a larger circulation of air. One of the greatest sources of engine trouble was valve failure due to high cylinder head temperature and inadequate lubrication. The engineers at Wright Field corrected this by a new system of oil crossover tubes which connect the cylinders in the same bank.

A greater margin of safety was provided, especially at take-off, by the modified cam slots in the propeller domes. Through this new equipment it is possible to get an additional 200 rpm—a small increase but one that makes a difference.

The electric propeller governor head caused trouble because of the high frequency of the Wright engine used in the Superfort. Enormous vibration caused the small resistors and resistor clips to break. When they broke the propeller governor jammed at the rpm being employed. New type resistor clips are now being used and improved.

More than anything, the problem of fuel has always been the bugaboo of the 20th Bomber Command. Where the 21st Bomber Command could get gas in to its Pacific island bases by boat, the only method of supplying the planes in China of the 20th Bomber Command was to fly innumerable trips across the Hump. Knowing this would have to be done, the early B-29s had an improvised fuel system with an off-loading manifold to permit the planes to be used as temporary tankers. Some of the bomb bay tanks were semi-permanent and very difficult to remove. The new plane has these tanks installed in a section of the aircraft that was formerly empty. The additional tanks can be quickly installed in the bomb bays.

When pressurized at high altitudes on some of the early missions, the windows of the Superfort frosted like a glass suddenly thrust into a refrigerator. The bombardier could not see the target and, even worse, the gunners were trying to find the enemy fighters through an opaque glass. The cabin air heaters were rearranged so the warm air now hits the windows in a constant air flow and it is no longer necessary to aim the guns by guesswork.

It is one thing to be the Human Cannon-ball in the circus and be shot into space to land in a net to great applause and a fat salary. It is another to be a waist gunner in a B-29 kneeling at your position and suddenly have the glass blister in front pop out due to the strain of the pressurization, and find yourself hurled hundreds of feet straight out before starting a 20,000 or 30,000-foot drop. Two things were done to correct these unintentional acrobatics. A new-type laminated blister is being used and a new-type harness was devised which holds the gunner inside even if the blister is punctured or blown out.

The B-29 is the last word in bombers. In some details it is too much the last word. The extraneous items can become a dangerous nuisance, for they take up weight and space which can be occupied by additional fuel or bombs. There is plenty of room for each man to do his job at his station but the Superfort is not a Pullman car, regardless of what the rumors are. There is no space for fancy-pants equipment.

One of the first things that went were the elaborate electric stoves for those wonderful hot meals like the ones mother used to make. No one has enough time or energy to play mother when he is flying combat in the stratosphere. Besides, flight rations and K-rations, supplemented with fruit juice and coffee are as good as a picnic—if you can think of a 4,000-mile bombing mission over Jap territory and water as a picnic. The de-icing equipment was removed as unnecessary. In some of the earlier missions where little opposition was met, the ammunition loads were reduced to half and less.

A healthy bomber has its bomb bay doors open for the shortest possible period. Not because it might catch cold

(Continued on Page 36)

THE SHOOTING STAR

The P-80—our newest jet fighter—is living up to its name

Scores of fighter pilots returning from combat have expressed a desire to take over the controls of a jet plane as their next job. A tremendous interest has been shown in the new P-80 "Shooting Star," and a great many questions asked about the transition training.

It is impossible at this time to answer fully either the who or how of training for the P-80. Introduction of the Shooting Star to operational use and the conversion of AAF personnel to its use, however, will be much smoother and present fewer problems than were involved in the debut of other types of aircraft.

The jet is so easy to fly that the average pilot can make the transition from the conventional type fighter after a very short period of training.

And because no complicated transition program is necessary, fighter squadrons in theaters of operations are as likely to be converted to the Shooting Star overseas as are units still in training in the United States. Neither will there be a special P-80 training program for ground crews, who, like pilots, will be trained on the job.

Another decided advantage in the shift to jet is that the AAF has a jet-propelled fighter already available for preliminary training—the P-59. It is expected that this predecessor of the Shooting Star will be as useful in introducing the P-80 as the B-17 was in B-29 training.

Every pilot who has taken the P-80 up has been impressed by its flying qualities. Warm-up is instantaneous, thrust is available in less than a minute after starting. Taxiing and landing require certain knacks that an experienced pilot can easily pick up.

"The P-80 is hot, and it's easy to fly," is the conclusion of Col. Bruce K. Holloway, veteran 14th Air Force fighter pilot, after flying the new AAF jet-propelled fighter plane. "In contrast to a P-51, the P-80 is so smooth and quiet that you can talk in a normal voice with the engine going full blast. What impressed me most was the absolute lack of vibration. You don't seem to accelerate, but rather have a constantly increasing feeling of power. You roll along and gradually gain flying speed. Best of all there is absolutely no torque. Flaps help on take-off because you need a much longer run in the P-80 than you do in a P-51, but that's true of any jet-propelled job.

"As soon as the Shooting Star picks up a little speed, you really begin to appreciate the power. With the constant thrust the jet gives, you still have good acceleration in the higher speed brackets. Once the P-80 is wide open, it seems to float through the air with the greatest of ease. There's absolutely no sensation of tension or vibration when it's opened up, in direct contrast to any other type of plane."

The P-80's chief influence on fighter tactics will come, of course, from its speed. In simulated combat, returned pilots from Lt. Gen. Carl Spaatz's Strategic Air Forces in Europe and flyers of the 20th Air Force have cooperated with commands in the United States to demonstrate the combat qualities of the plane. Bomber crews learn as much as jet flyers from this kind of collaboration. One B-29 crew, however, swears that they didn't even see the P-80 make a pass —it went by so fast.

Most impressive statistic thus far announced about the P-80 is that the first model was designed, constructed, and flown in a period of 143 days. For this swift development there are two reasons. The first is the relative simplicity of the plane; the second is the scope of the experimental program which preceded it. Aerodynamically the Shooting Star is one of the cleanest aircraft ever built. The fuselage is of semi-monocoque construction, all the skin being flush-riveted to reduce surface drag. By elimination of the propeller, ignition system, cooling system, carburetor, and all the more complex controls of the conventional fighter plane, construction was made relatively easy.

Ease of construction carries over to the maintenance and repair of the P-80. Its engine can be changed in about 15 minutes, compared with the 8 or 9 hours required by a standard fighter (see "Almost Too Simple," AIR FORCE, January, 1945).

The story of how this airplane reached production is short but impressive. In July, 1943, the Air Technical Service Command provided Lockheed with an English engine patterned on the jet invention of British Air Commodore Frank Whittle. Drawings and general model specifications made by Clarence L. ("Kelly") Johnson, chief research engineer of Lockheed, were approved, and the plane was designated XP-80. Behind a wind tunnel in California, "Kelly" Johnson pitched a tent and into it corraled 23 engineers and 105 workmen. With a handful of rough sketches he started to build the Shooting Star piece by piece. On November 15, the XP-80 was delivered to an ATSC experimental flight test base in California. A process that usually takes about a year and a half had been completed in less than five months.

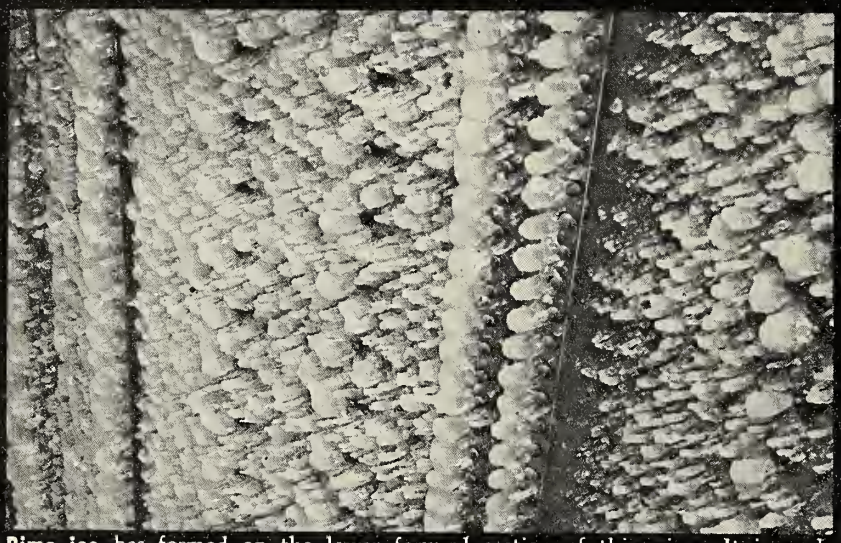
In February, 1944, AAF test pilot Captain Wallace Lien initiated the Army test schedule, and immediately broke all existing U. S. speed records, subsequent test flights by Captain Lien and Majors Everett Leach and Fred Borsodi led to the incorporation of the General Electric version of the turbo-jet principle. Other modifications were later incorpo-

(Continued on Page 58)

Cracking Ice

BY S/SGT. DOUGLAS J. INGELLS

AIR FORCE Staff



Rime ice has formed on the lower forward section of this wing. It is made up of white, rough crystals which build up and grow out to the windward.

Ice completely enclosed this cockpit and fr the windshield wiper against the solid sh

A B-17 was grounded at Ogden, Utah, because of bad weather east. Treacherous icing conditions were reported throughout Colorado, Nebraska, the Dakotas. But the Fortress pilot insisted he could go through, anyway. This pilot had good reason for his confidence.

The B-17 took off, battled through tough ice clouds, landed several hours later at Minneapolis, Minn., without a single speck of ice on it. The pilot was Walt Bullock, veteran of more than 16,000 flying hours and now senior pilot at the AAF's little-known Ice Research Base in Minneapolis where scientists and airmen are finding out about ice and its effect on the airplane. The plane was a specially-equipped, heated-wing B-17 that cut through the heavy ice formations like a hot knife through butter. The flight was a proof-test to see how the new system worked.

Despite the test, however, Bullock warns: "There isn't a pilot living who can say he knows a lot about ice. If he makes that claim he's a liar because none of us, until recent months, has been able to stay in the stuff long enough to learn anything about it."

If any men know, these pioneers at the Ice Research Base are the ones. During the winter months of 1944-45 this small group of engineers and pilots—who take off and fly purposely into the teeth of ice storms as part of their daily diet—has provided the first truths about ice and its effects on flight characteristics of aircraft. For the first time, because of heated wings and tail surfaces and anti-icing devices for propellers—which they helped to develop—these men can fly in severe icing conditions long enough to study, measure and photograph the how, why, shape and effect of ice formations.

Ice is the airman's greatest hazard. He can fly blind through the thickest fog without fear, relying solely on his instruments. He can, with latest devices, land safely in zero-zero weather. But when ice forms on the leading edge of a wing, changing its shape and slowing down its speed; when the stuff cakes up on propeller blades decreasing their thrust; when it collects on radio antenna and snaps it off, or when it gets into a carburetor and stops an engine, then the "white devil" becomes a pilot's worst enemy. So, if the AAF is to have global flying in all kinds of weather, it *must* defeat icing problems. That is the goal of the men at IRB.

Their work is best summed up by Lewis A. Rodert, who is head of NACA's engineers at the base. He calls it "looking for ways of de-icing planes and making our ice prevention systems pay for their own ride."

"Our job is to take an airplane," Rodert explains, "consider its overall performance and the purpose for which it was designed, then build into it ice preventives that will make the plane do the same things under every conceivable icing condition."

To defeat ice, the AAF, commercial airlines, the National Advisory Committee for Aeronautics (NACA) and U. S. plane manufacturers—all represented at the Ice Research Base—have been responsible for three anti-icing systems—chemical, mechanical, hot-air. The chemical sys-

The AAF's Ice Research Bureau is winning the last battle in its war on the "white devil" of flying

Civilians play an important part in the battle to overcome ice. Here an engineer examines a droplet catcher.

ion of a deicer boot along the leading edge the vertical fin kept this section cleared.

Temperature of the outside air is taken by an engineer inside a C-53. It is done by sticking poles wrapped in sensitive paper out into windstream.

tem can be compared to sprinkling salt on an icy walk to melt it. The mechanical system (de-icing boots) cracks off the ice after it forms, while the hot-wing uses hot-air piped into the wings and empennage to prevent ice from forming.

Of the latter, which is the newest, test pilot Bullock says: "With the heated wing you don't pick up any ice. The leading edge gets so hot you can fry an egg on it."

Each system is satisfactory for its particular assignment according to IRB's extensive actual flight data. But now the researchers are going a step further—developing instruments that will tell a pilot when to turn on his anti-icing units, whether or not the systems are working, what kind of ice he is flying in, how to get it off the airplane. In addition, they are seeking the answers to three pertinent questions which have arisen with changing aircraft designs: What effect does ice have on new airfoil shapes and smooth skin surfaces of our latest planes? Will the high speeds now attainable with some aircraft produce so much friction heat over the plane's surfaces that pilots won't have to worry about ice? How will jet engines function under icing conditions?

Camera stations in the fuselage of a heavy bomber called 'Bug-eyes" allow photographing water droplets as they strike the airfoil and turn to ice. Hair-like strain gauges measure the change in lift or drag. In this way the scientists can tell the size of the water droplets, the temperature of the airfoil surface when the droplets strike it, how long it takes them to change to ice.

A B-25 airplane—"Flamin' Mamie"—has latest heated-wing installation which is instrumented to measure ice accretion. On one flight in January this year it was discovered that an inch and a half of ice built-up on the unheated portions of the airplane in the time it took to descend through approximately 3,000 feet of stratus overcast. In similar tests, the fastest ice accumulations noted has been two inches in five to ten minutes. During tests in which ice was allowed to build up on the leading edges of the wing before the heat was turned on, a maximum of one minute was required to rid the wings of ice.

Numerous other tests have proved:

There are two kinds of ice—rime ice and clear ice. The former consists of white, rough ice crystals which build up and grow out to the windward. It is the type you see around refrigerator coils. The latter is hard and glassy, like cubes in an ice tray.

The kind of ice depends upon the size of water droplets in a cloud. Small droplets produce rime ice. Large droplets produce clear ice. If droplets are small, final freezing occurs quickly. If droplets are large, they have opportunity to spread out into a thin sheet forming clear ice.

The type of cloud determines the size of water droplets. In clouds with little turbulence, there is no presence of large drops of water, therefore, only rime ice is accumulated. Turbulent clouds sustain large droplets, producing clear ice.

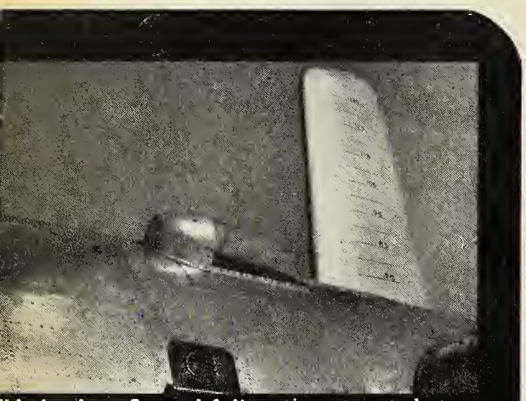
The concern as to whether the ice is rime or clear is entirely eliminated by the hot wing.

Rime ice is responsible for a new problem called "Run-

back." Some of the small droplets freeze instantly when they hit an airfoil section but others flow backward and freeze later on a wing portion that has no heated surface.

The most dangerous temperature zone for icing is between 0° F and —18° F with the most serious icing-up occurring around —70° F.

"The extent of our knowledge," asserts Ray M. Potter, Chief engineer of the IRB Staff, "depends on the ingenuity of our engineers to design instruments for measuring occurrences that we never before have been called upon to measure."



This laminar flow airfoil section mounted atop B-24 is a complex laboratory of instruments used in the fight to overcome icing-hazards.

This B-25 used for frost tests got its name when it caught fire on a take-off. Scampering figures depict Pilots Walker and Olsen, below.

The trick "bug-eye" cameras are one example. Another is a gadget that looks like a rocket projectile. With it engineers catch snow flakes from the airstream in the open end of a tube, hold their shape and size until they spat against a small glass plate and leave their imprints to be photographed.

A similar device, but much smaller, has a pair of tiny jaws that snap individual water droplets out of the air, impinge them on a small film so they can be studied under a microscope. Use of a photo-electric cell and a beam of light which shoots across a wing surface measures the number of water droplets striking the wing.

Eventually there will be instruments on the pilot's instrument panel which will tell him the presence of ice and what to do about it. The next step will be instruments which the pilot cannot see that will automatically turn on and off the wing and propeller anti-icing systems. Flying through ice will then be as simple as flying blind through fog.

Other test instruments are being fitted to the skin of "Flamin' Mamie" to determine the effects of friction heat at high speeds. Sometime soon the pilots are going to take the plane, get some ice on it and dive it in the neighborhood of 400 mph to see if they can lose the ice because of the heat caused by the rushing air over the wings.

What this can mean is quite simple. If the heated wing normally requires 100° heat to keep off certain ice formations and it is learned that high velocities produce—say 30° heat over the plane's surface—then it would be necessary only to furnish 70° heat to the wing. That could mean a saving of weight and size in present hot-wing systems.

NACA's Rodert points to another interesting prospect for heated-wing airplanes. He cites the example of the Frenchman, who, long ago, got 30 percent more range out of an artillery shell by heating its forward end. The "hot head" caused the air in front of the shell to heat-up and expand back over the shell's surface creating additional forward thrust. The same thing may be true of the heated wing, which, if it is made hot enough would throw back more thrust creating the effect of a heat engine.

"If it works," Rodert explains, "then, maybe, we can make heated wings pay for themselves by turning their own weight into more mph."

The more simple tests engaged in by IRB are concerned with cabin heating, windshield de-icing, frost formations. The first is the direct result of our fighter pilots complaining about getting "cold feet" because something was wrong with cabin heaters in fighters.

The P-63 is one example. Previously, warm air came into the cockpit from one side of the cabin. In the particular case of the Kingcobra the pilot's right foot was blistering hot while his left foot was freezing. It was the same on the P-38. Now engineers have made a "Y" shaped ducting arrangement that heats the whole cabin evenly.

A new method of eliminating ice from windshield is working effectively. A water-repellant chemical can be rubbed on like furniture polish and forms a smooth outer-coating for the glass. Tried on the windshield of the B-17, it caused water droplets to bounce off like rubber ball.

At present a B-25 is at Edmonton, Canada, for frost tests. Initial results show that frost on the airplane's wing cuts down its lift, requires increased power for take-off. Using hot air to get the frost off the leading edge of the wing the plane loses very little lift, is assured of take-off with safety. By eliminating the frost entirely from the whole surface of the airplane, take-off distance is reduced by one-half.

The scientists are also studying the psychological effects which icing conditions can have on a pilot. Al Becker, another of the pilots, admonishes that "Ice is like drinking too many Manhattans, if you don't watch out for it the stuff will catch up with you." He cites several cases when he has seen ice forming on the wings and not paid much attention to it only to find himself in a tough spot minutes later.

In addition, Becker says: "A pilot becomes alarmed and excited when he sees his airspeed drop off too rapidly or feels his controls become sluggish—two initial indications that a plane is flying in ice. He knows that things aren't happening in his favor. Then, when propellers ice up and throw back big hunks of ice that go crashing into the fuselage or tail—that's enough to scare hell out of anyone."

Recently one of the B-24s had its props ice up, large chunks of ice were thrown back against the fuselage—one piece crashing through and hitting a test observer in the face. On that particular flight, which was the worst last winter, IRB almost lost an aircraft, but engineers learned an important lesson. Sticking it out in the ice with the plane vibrating like a triphammer, they discovered a fault in the Liberator's heated empennage system which has resulted in production changes.

Thin layers of ice formed in spots along the leading edges of the vertical tail fins even though the heat was on. The two layers of skin which form the duct through which heat is passed were too close together and the excessive vibration "joined them" in certain places stopping the flow of hot air and allowing ice to form. On the latest systems skin layers are farther apart.

Ironically, this actual test only confirmed what engineers with their pencils and pads had predicted might happen "under certain conditions." Fortunately, they found out what would cause it in time to do something about it before someone got hurt.

On the strength of such tests, the lessons learned and the ultimate preventives that are being prescribed, the AAF is looking forward to the day when the dreaded word ice means something you find in a cocktail glass after a smooth flight and a happy landing. ☆

the orange flash

By an Air Force Overseas Staff Correspondent

The South African Air Force has handled some of the toughest assignments in the whole war

The Liberators floated over the burning sections of Warsaw at 500 feet, with their flaps down. Nazi searchlights tracked them, antiaircraft fire mushroomed around them, and enemy night fighters were vectored in to point-blank range.

The Libs dropped lower. They even slowed down.

The bombardiers were not looking for a pin-point target. They were searching for flares which would indicate where Polish partisans were holding out. These Liberators were carrying supplies.

"Three hundred and fifty feet," a copilot said. A bomber on the wing spun and crashed in flames. "Three hundred feet." Two more bombers were caught by the ack-ack. "There's the flare!"

Dodging in and out of flames which rose above their altitude, the Libs made two runs over the blazing target. Crews watched precious packages of supplies tumble towards the partisans.

Twelve hours after they had taken off, some of the Liberators landed at their Italian bases—only some, for the losses were an even 40 percent. But the underground fight against the Nazis had been aided. The South African Air Force had done another good night's work.

A few days later this same South African squadron was briefed for another drop mission on the Polish capital. The only eomment came from the other night flying Liberator squadron of the SAAF. They demanded that they share the hazards on this and any other such missions. The AOC (Air Officer Commanding) nodded his agreement. And on the remaining four missions to this target the two SAAF squadrons put up an equal number of aircraft and suffered the same staggering losses—40 percent. Each time they dropped the supplies that were flown from England to Italy and then to Warsaw's partisans.

They were gallant but futile missions. The partisans were crushed.

"I guess it was the toughest target we've ever had. And we've had our share of them," one of the flyers said.

Planes of the SAAF dropped supplies to Tito's Yugoslavian Partisans. They mined the Danube, did their share of bombing German and Italian targets, fought with the Balkan Air Force, battled the Italians in Ethiopia, formed a large part of the Desert Air Force, and are still operating in strength with the Mediterranean Allied Air Force.

In the air war over Ethiopia, they used Junkers JU86s which had been taken from South African commercial airways and converted into bombers. Later, they got Marylands—Glenn Martin F-67s—manufactured originally for France. In Africa, they flew A-20s, Spitfires, and Beaufighters in tactical operations, Mosquitos for photo-reconnaissance, and Catalinas and Venturas for antisubmarine patrol and sea searches. With the Balkan Air Force, they had Venturas and A-30s. Now, most of their planes are made in the United States, like the C-47s they fly in a transport service between Rome and Pretoria, the capital of the Union of South Africa.

"Just give us a plane," they say. "Any plane, and tell us where you want us to fight."

Many kind things have been said by our fighting men concerning the South Africans, but little is known about them. The fuselage markings on their aircraft are the same as those of the RAF except that the center ball is orange instead of red. On every South African's uniform, just above the shoulder seam, is an inch-wide orange strip known as the "Orange Flash." The SAAF is the only British allied air force which is not "Royal" and which has no initials in the center of the wings. Instead, it has the many-colored crest of the Union of South Africa.

They are experts at Pathfinding and night bombing. Their tactical work has won the admiration even of the Germans who referred to two SAAF desert squadrons as "more dangerous than several dozen squadrons which are operating against us, shooting up our lines of communications and forcing us to move at night." And they have done every other type of flying in the book. When you count up our allies, be sure to put the men of the "Orange Flash" with those at the top of the fighting list. ☆

THIS IS YOUR ENEMY

. . . it's your life or his

Receiving End. Marshal Model's pet phrase describing Allied airpower as Germany's "Enemy No. 1" and numerous less articulate comments about what bombing has done to German towns, troops, and attitudes are well known. The feeling of a German who watches his own forces under attack day after day has been set down simply by a Wehrmacht writer. He escaped St. Vith; his comment is on the operations that followed.

"Today is sunny. American bombers arrive early. Alert, alarm, all clear, another alarm. So it goes. We hear that the Army Group has been advancing since 1300. There is good feeling everywhere.

"The advance to the west continues. Traffic is heavy. The buzz bombs are being launched. Prisoners, more prisoners—all American. I talked to the German civilians and asked them how the Americans behaved when they were here. They were favorably impressed. Our attack coincides with the American regrouping of forces.

"Clear sky. Jabo weather. MPs have a hard time keeping things going. What a job! Rain and snow. Again we move. We walk instead of going by automobile down the highway. American Jabos attack everything on the road.

"Brilliant day. Only the Jabos hang like a swarm of wasps in the sky. Bombers flying eastward at great height. Which German city today? My luck lasts. Yesterday a bomb near the house, with me in the cellar. Today a bomb just a few yards away. The bomb carpet—never has there been anything like it.

"Again, Jabos like wasps. Flak gets a few. Two German fighters are shot down.

"Clouds. No Jabos. What a relief!

"Clear day. American bombers flying east. Thanks to Providence the Fuehrer has given us strength to endure."

April Again . . . April is a month of fables in Japan. In any other country the fact would occupy the calendar makers, a few poets, and the sentiments of the people. In Japan this month's fables are closely connected with the war. In April, 1942, the ministers of state lingered over every festival, reciting victories. Three years later, Japan now faces a different April, and there is a different chorus.

Chief among the "Days" of this Japanese month are April 3, anniversary of the Death of the First Emperor; April 29, Birthday of the Reigning Emperor; and April 30, Festival of the Yasukini Shrine. The Fourth of July, Christmas, and Easter coming in one month would be a holiday analogy. But the military equivalent would not be there. Mysticism of these days spurred the 1942 victories and encourages the grim defense of the Empire in 1945.

The bravest note struck by the senior statesmen in the national celebrations will be that of Kamikaze, or Divine Wind. In 1263, the story goes, Kubla Khan, leader of the Mongols, took the empire of China. In 1275 and again in 1281 he sent his fleets against Japan. Storms scattered them, and the invasions failed. It was a Divine Wind that saved the island, the Japanese say. In 1945 the name is perpetuated by special air squadrons; and there is no title more honored in the Japanese forces today.

"Today a bomb just a few yards away. . . ."

The Japanese ministers of state have prefaced celebration of the Emperor's birthday with apologies for the bombs that have come uncomfortably close to the palace. With anger they have rejected the foreign title Mikado, and for weeks official pronouncements have echoed "Tenshi, Son of Heaven," and "Tenne, Heavenly King." This is neither poetry, nor madness. A Mikado can be whittled down to exile and oblivion—but not a Heavenly King.

The Yasukini Festival comes very close to the ordinary Japanese soldier. The festival centers in a Tokyo shrine, built at the time of the Russo-Japanese war but associated with the prehistoric name of Japan, Yasukini, Peaceful Country. Departing for the front, Japanese soldiers promise to meet again at the Yasukini Shrine in some April after they have been promoted to Kami or Shinto gods in token of their death in battle.

The April fables of Japan have a good deal to do with Japanese sentiments; more important, they are essential to Japanese military spirit.

Seen from the Air. Aircrews have recently reported a variety of Japanese tricks which add up to ingenious and potentially effective defense. For Japanese ingenuity, the best evidence is the bomb crater that isn't there. Expert at disguising everything from an airstrip to a destroyer, the Japs are using a powder substance which, scattered on the ground, looks very much like a bomb crater. Down in the Solomons area, where Japanese equipment has not given out but is running low, massed rifle fire is being used against low-flying allied planes. It isn't flak, but nobody who has faced it sneers at this last-round defense. In other parts of the Pacific, anti-aircraft guns are not lacking. An American bomber crew spotted a Jap transport carrying an unusually large AA platform in the bow, mounting four three-inch guns. In addition there were a 25 mm in the tub forward, and six light AA guns—probably single mount, 25 mm—mounted three on each side of the bridge. On the side of passive defense, the most impressive show the Japanese have made is the set of fire-prevention devices in Tokyo. Their effectiveness is accented by earlier amateur prophecies that a few incendiaries would burn that capital to the ground. Less important but more picturesque is the "wooden kimono" devised for Japanese railroad engines. Bomber crews flying over occupied areas report that the Japs have massed planking around the boilers as protection against Allied strafing. For wiliness as distinct from outright defense, the Japanese and the natives friendly to them showed a pretty good hand this winter. Best trick was their attempt to lure rescue planes into dropping food and supplies by setting out simulated distress panels in terrain unsuitable for aircraft landing.

The Name Is Pelz. After the GAF's damaging attack on Allied airfields early in the year, veteran observers described the operation as "pure Pelz." The phrase echoed the fighting reputation of Generalmajor Dieter Pelz, commanding Jagdkerps II, GAF tactical command in the West. Typical of this assault was the mission of a group of ME109G 14s. Led to the front lines by a JU88, they did most of their flying over hostile territory at 150-200 feet. Slashing in at a time when they hoped Allied flak would be light, they took tremendous losses. The operation, which had mustered pilots even from instructors pools, was planned and carried out without regard to loss.

This "all-out" fighting has characterized the youthful German general since the days when the Luftwaffe was the scourge of Europe. Praising Pelz's record as a Stuka leader in the old days, his Patron, Marshal Goering, said that he was the aerial master of "Ueberfall" and "entscheidender Angriff"—surprise and decisive attack. General Pelz's aggressiveness has often been expensive to the Luftwaffe. In 1942, his forays against Allied shipping in the Mediterranean cost him so many planes that his unit was forced to disband. In the next year he commanded attacks against English cities and headed Fliegerkorps IX during the little blitz of 1944. More recently he was prominent in the Normandy campaign.

"Massed rifle fire is being used against Allied planes—"

The Old Familiar. While a great deal of Japanese propaganda has been devoted recently to new Japanese aircraft, the old familiar planes continue to get their share of attention from aircrews. Pilots in the Eastern Air Command have been tipping their helmets to the acrobatic skill of Zeke pilots. More than the widely advertised Jap skills in maneuver, however, these pilots emphasize the fact that the enemy flyers apparently are thoroughly acquainted with the fighting characteristics of planes like the P-47. . . . A P-38 pilot has reported his recent experience with a very maneuverable Oscar Mk II as follows: "This bandit went out of a right turn into a dive, followed a split-S with a chandelle, dropped down to the deck and poured it on for a getaway, during which he joined his ancestors." . . . The Peggy is vying with

the Sally as Mitsubishi's "flying museum." On a Peggy recently examined the following equipment was noted: full feathering constant speed hydraulically operated propeller, a Focke-Wulf type cooling fan, a Browning type 20 mm cannon, a flexible metal ammunition chute, and a new radio altimeter. Koiso was not joking when he promised, "We will use whatever is useful wherever we find it."

"The old German trick of flying a captured and reconditioned American plane—"

FYI.... B-29 crews continue to report varied color schemes among Jap fighters: black, grey, silver, and olive-drab Tojos; black and olive Oscars; silver, grey, olive, and dark green Zekes; grey and olive Tonys, and a sprinkling of mottled brown, brown and orange, and brown and black combinations. . . . The old German trick of flying a captured and reconditioned American plane into the vicinity of a bomber formation continues. Obvious purpose is to give altitude, speed, and direction to flak and fighter stations. . . . Jap gliders have come into greater prominence since the invasion of the Philippines. The Betty has appeared as tow-plane. . . . "Orgelpfeife" is the name for the German trick of simulating more than one plane. The idea is for a flyer to give numerous call numbers, changing his voice and dialect. One German fighter pilot flatly claims he made a bomber crew think his one plane was 12 fighters. He didn't say which crew. . . . Numerous reports from the 14th make it clear that Jap planes have been made much safer and that their pilots are less likely to bail out than formerly. . . . Schwarz von Berk, German commentator, points out that the alphabet of invasion was slow getting past the first letter: Avranches, Aachen, Antwerp. Herr von Berk, being a scholar, neglects to point out to his readers that even in Low German, Berchtesgaden and Berlin do not begin with Z.

The Enemy's Enemy. It is unlikely that the Japanese Air Force has seen many American movies since 1941. A training pamphlet explaining what American flyers are like fills in the gap. As others see us, Americans do not understand what the war is about. We do not understand Greater East Asia. We do not like the British, the Russians, the Irish, the South Americans, the French, the Spanish, or anybody but us. We don't even like people in our own country sometimes. The reason for this is that originally we were all British, Russians, etc., etc.

An American, the Japanese flyer is asked to remember, has a very strange religion. It crops out in queer places. It is likely to make him homesick (a complaint very common with an American away from a city). It can turn into depression, elation, or sudden foolish bravery. It has no connection with the way the country is governed. American politicians, the pamphlet points out, are not divine . . . just elected.

An American is most likely to talk when flattered. He can easily be flattered about practically anything—his country, the AAF, his equipment.

American airmen (principally because they don't understand East Asia and do not associate fighting with religion) do not "blaze with spirit." They do, however, have good equipment ("Whenever they have overcome, it has been because of overwhelming numbers and superior equipment"). They fight wildly and wastefully. They are obsessed with pride. They rely on speed and machinery—a chief reason being that most American aircrews grew up with automobiles. They shoot well, mainly because they have spent their youth hunting wild game.

The symbol of the American airman, the pamphlet concludes, is the Soulless Machine. The Japanese airman, on the other hand, is Spirit. "Blazing with this spirit, the JAF will win the war, if it takes 1,000 years." Unlike the Soulless Machine, the Japanese Spirit doesn't bother about time.

Enemy "Souvenirs". Interest in the Germans and the Japanese can be carried too far when it includes "souveniring." Not long ago a relatively new piece of German communication equipment was studied to the great advantage of every Allied unit that has to meet the German plane carrying it. The equipment had reached Technical Intelligence in a very roundabout way. An eager-beaver had tried to adapt it to his own use without letting the rest of the AAF in on the news. Commendable as experiment may be, it wasted valuable time in this case.

In another instance, a small Jap gadget was picked up among the souvenirs of a soldier in the Pacific. It had been well known for some time, but had not been captured in quantities sufficient for study by the units concerned. The soldier who set it aside was absolutely correct when he said it wasn't "unique," and absolutely honest when he added that he didn't have the foggiest idea that it was of military value. But the simplest rule to follow in dealing with enemy material is this: Let Technical Intelligence have the first look and the last word.

Lesson in Language. The stories about Japanese difficulties with the English language, and their occasional prowess in American versions of English works are legion. Col. Jack Dale, Assistant Chief of Operations for the Third Tactical Air Command, a veteran of nearly 200 missions against the Germans and the Japs, gives the other angle. The Colonel was once explaining laboriously to a Jap airman the difference between the planes that the two enemies flew. In pidgin English he gave an elaborate description of his fighter, gestures and all. After a considerable oration, he relaxed. "You mean," said the Jap, "that you fly a P-40E." ☆

Recon photo shows 855-foot drydock, capable of servicing 50,000-ton ship. This huge dock was towed by British from England, taken by Japs in 1942.

As B-29s approach, little harbor boat throws up futile smoke screen, vessel in drydock gets up steam, throws her lines off.

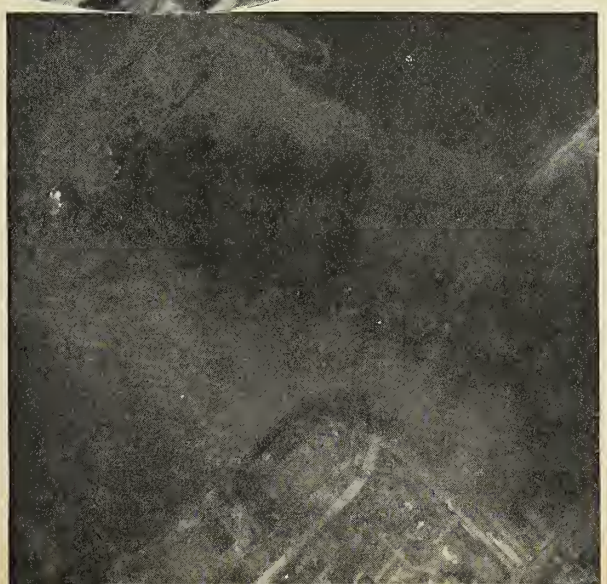
strike at SINGAPORE

Lead bombardier, Lt. J. McCraw, gets bullseye. Other bombardiers followed.

In a spectacular smash at Singapore harbor, India-based Superforts completely demolished the huge George V floating drydock, one of the last available to the harassed Jap navy. This attack was bitter tea to the Japs who had just spent three months repairing the caisson gate, breached by B-29s in an earlier raid. The Superforts expected 10/10ths cloud cover over the target, were pleasantly surprised to find a clear view of a 460-foot cargo vessel sitting in the drydock. The Japs did all they could to frustrate the attack with ack-ack, fighters and last-minute smoke screens. Three fighters were knocked down. Brigadier General Roger M. Ramey, 20th Bomber Command CO, stated: "The bombing accomplished ranks as one of the finest examples of precision bombing of the war."

But this photo, taken next day, shows drydock flooded, ship gutted with decks awash.

Ship burned so fiercely PI boys could not determine drydock's damage from this photograph.

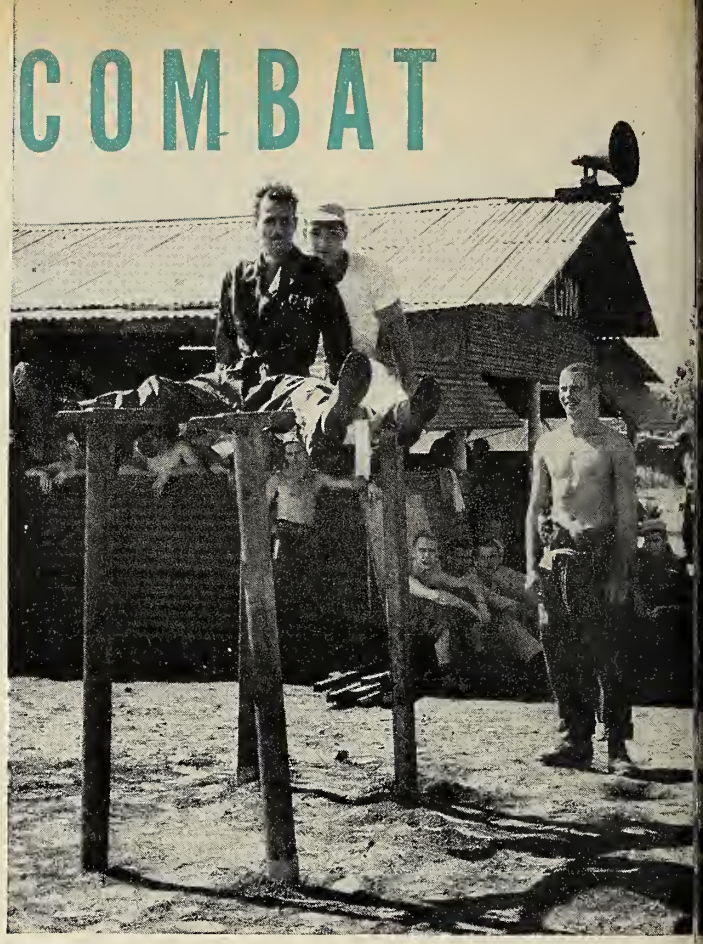


RETURN TO COMBAT

Refitting temporary casualties for further combat in the Far East Air Forces posed a serious problem.. Medical care could cure physical ills, but there were neither facilities for recreation nor opportunities for reconditioning activities. Here's a solution

BY MAJ. HERBERT O. JOHANSEN

AIR FORCE Overseas Staff



Patients on these horizontal bars may not have perfect balance when they get those GI shoes into air, but it is good exercise.

Jungle Brook Golf Course at Hollandia AAF Convalescent Training program was one of the earliest installations in this project.

It was a tense moment at the last tee on the Jungle Brook Golf Course at Hollandia, Dutch New Guinea. An air force sergeant took careful aim, swung his club deliberately, followed the ball with intent eyes. It rolled up to the cup, teetered on the rim, dropped in.

"A hole in one!" shouted a dozen gleeful GIs wearing green fatigues marked with the distinetive "CT" of the AAF Convaleseent Training Program. They were cheering not only beeause the sergeant had won the match, but in antieipation of the party that would be held in their ward that evening as a prize.

"See what I mean?" said the medieal officer. "They've forgotten they're in the New Guinea jungle, in the midst of a war, far from home. And that means they're getting well fast."

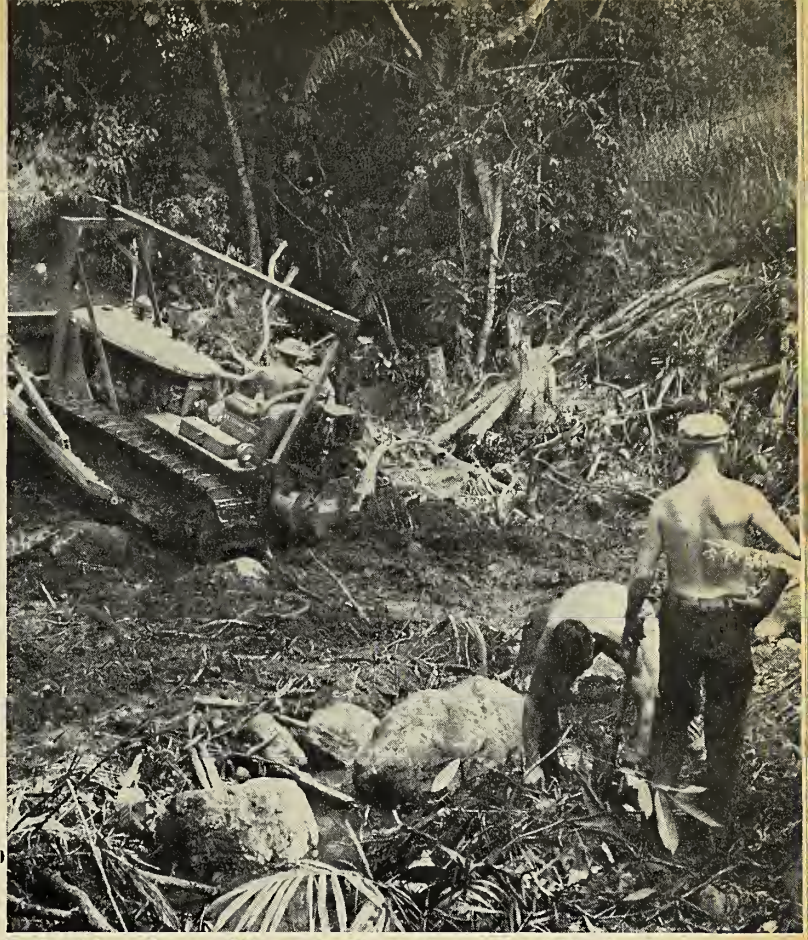
The Far East Air Forces have learned through neeessity to be thrifty, in planes, airerews and ground personnel. On this principle of economy a program to conserve trained manpower, to rehabilitate casualties for return to eombat, seemed highly advisable.

Inaugurated by Col. Keith Simpson, Air Surgeon of FEAF, this Convalescent Training Program is now in full operation in the Philippines. When it was established at Hollandia, Dutch New Guinca, it was the first such program to be initiated in any General Hospital in any theater of operations. When the 51st General Hospital was designated as a hospital for air force personnel, the Convaleseent Training Program became an integral part of the setup. Although speeifically designed for AAF needs in that theater, the program is open to patients from every branch of the service. This is an extension of the AAF Convaleseent Program which has been operating in AAF hospitals in the U. S. for two and a half years.

As reconditioning of the body is one of the main objee-

Jungle Gym was created out of imagination and supplies at hand. The little guy seems to be portraying a human punching bag.

Look closely and find the chicken. This fowl is part of the now celebrated fried chicken and scrambled eggs program at hospital.



Enticed by a few worldly goods, the engineers at neighboring base brought over their bulldozer and scooped out a nice swimming pool.

tives of the program, a Jungle Gym was a high priority item. What had been completed as an empty building one night was almost miraculously filled with a variety of homemade gym apparatus the next day. Odds and ends made a rowing machine; tin cans filled with cement and attached to a length of pipe made weight lifts; the side bars of an ambulance litter furnished the essential parts of parallel bars; no one asked how fencing foils and a punching bag materialized in the jungle wilderness. The pride and joy of the Jungle Gym, however, is a stationary bicycle of a sturdy build. Into it went a Japanese bicycle frame, an Australian seat, one Japanese and one American pedal, English handlebars, the rear weighted wheel from the end of a signal corps wire drum, and the brake spring from an American spring door.

One of the first patients to participate in the program had been a designer and builder of miniature golf courses in civilian life. With the help of other patients and staff officers, he constructed the Jungle Brook Golf Course. When 24 Rhode Island Red chickens flown up from Australia in a C-54 were threatened with extinction due to climate and lack of expert care, another patient came to the fore and announced that he had been breeding and raising chickens since he was a boy. Thus was inaugurated the program's popular "Scrambled Eggs and Fried Chicken" project.

The presence of a former University of Iowa swimming instructor started a chain of events that terminated in the Jungle View Swimming Pool. A site was found where a stream of fresh water flowed into a slight hollow. At a nearby Replacement Depot was a battalion of aviation engineers. In exchange for certain trade goods that are the GI gold of New Guinea, these engineers brought their equipment, dug up roots and trees and created a pool.

Crafts shops are an important part of the program. The collecting of an assortment of crafts tools in New Guinea had all the earmarks of a superior sleight of hand trick. A close investigation would undoubtedly reveal that the technique by which the trick was performed included cajolery, bribery and a bit of midnight requisitioning. Once the tools were acquired, raw materials to work on became a problem. Among the sources were wrecked Jap planes, tin cans, and the natural hardwoods of the area.

Admittance to the Convalescent Training Program is strictly limited to casualties who can be reconditioned for return to active combat within a short time. These men, both officers and enlisted men, would go back to combat even if there were no such program. The difference is they go back more fit, mentally and physically, and quicker.

The Convalescent Training Program now in operation in the Philippines is divided into three parts:

1. Bed patients. Craft work such as making leather novelties and simple jewelry; games such as bingo, discussion groups. This phase of the program is greatly assisted by Red Cross personnel.
2. Ambulatory patients. Although these remain in the hospital proper, they are able to go to discussion groups, take light calisthenics and participate in mild sports. Craft work is done in the shops, and games such as horseshoe pitching are available.
3. Convalescents. Participation, voluntarily, in all activities of the project, physical, recreational and mental.

Patients are admitted to the third phase only with the approval of their ward physician. They are then moved to the special Convalescent Training wards, apart from the more seriously sick. Everything possible is done to get away from a hospital atmosphere. ☆

Flying the ZEKE 52

BY HERBERT RINGOLD
AIR FORCE *Staff*

Our test pilots say the Zeke is inferior to our fighters, but there are plenty of 'em left

The reputation of Japanese fighter planes is somewhat similar to the community standing of certain shady ladies: it all depends upon whom you ask. Talk to people who knew them in their youth and you'll get a good report; speak to those who have observed them recently and you get a different impression.

According to our Army and Navy pilots who have flown the Zeke 52—the latest of the "Zero" class tested and currently the standard Jap Navy fighter—both opinions are correct.

Col. J. M. Hayward, chief, Technical Data Laboratory at Wright Field, reports, "Against the original P-40, the Zeke had certain advantages. But compared with our P-38, 47 and 51, the Zeke is, frankly, a second rate airplane. I don't mean to imply that the Zeke won't cause us a lot of trouble. At altitudes, it can climb faster than our Lightning and Thunderbolt and nothing we have in combat can turn with it at slow speeds below 10,000 feet. But in every other category, the Zeke is badly outclassed."

Commander Fitzhugh L. Palmer, Assistant Tactical Test officer at Patuxent River Naval Air Station adds, "If you fight the Zeke right, it will be nothing but a turkey shoot. But remember that it takes only one bullet to kill you—and you're just as dead as if you were shot down by the best airplane in the world."

Both service reports agree on one important factor: the Japs have much better airplanes than the Zeke 52. But as yet there are no complete laboratory reports on any later models. Fragmentary information from the field, much of it still in the rumor stage, indicates that the Frank I has a speed close to 425 mph, and the Betty 22, a twin-engine

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Sky Scouts

By an AIR FORCE *Overseas Staff Correspondent*

Bomber pilots flying Mustangs form the backbone of the 8th Air Force's unique Scouting Force

The first box of more than 1,000 bombers is due over the heart of Berlin a few minutes past noon. At 1145, a tiny formation of Mustangs knifes across the city and circles the target area. Ignoring the initial salvos of antiaircraft fire, the fighters methodically inspect the sky and then the ground below.

At 1150, the flight leader of the Mustangs calls the commander of the lead bomb division which is still 50 miles west of the German capital.

"Seven-tenths cloud over the suburbs," he reports over the radio telephone. "There's a hole over the target. A front is moving in from the northeast at 18,000. First division probably can bomb visually. The hole may close before the second and third division get over the target. There are no bandits in sight—"

And as a puff of black just off the wing tip blasts his Mustang upwards 50 feet, an added precaution:

"Flak fairly heavy near the center of the town."

The Mustangs resume their watchful circling. The hole in the clouds is closing rapidly but at five minutes past twelve when the leading Fortresses and their fighter escort arrive it is still wide enough to enable the bombardiers to make a sighting.

While the bombs are cascading out of the bellies of the heavies, the pilots in the Mustangs make a quick appraisal of the Fortress formations and then swing about for the journey home.

They are just moving across the Dutch boundary when they spot a gaggle of bandits. Switching his R/T to the fighter channel, the flight leader warns the Thunderbolts that are shepherding the bombers back from Berlin:

"About 12 ME262s southeast of Enshede. We are going to bounce!"

Jockeying for position, the Mustangs roar down for the attack. But the twin-engined German jets have no taste for combat today.

Re-assembling, the Mustangs mournfully inform the Thunderbolts that the enemy has eluded them. They continue across the Dutch countryside and over the North Sea to England. As they near the East Anglian coast, the flight leader radios the bombers a final word about clouds and visibility and a few minutes later the Mustangs land.

Over doughnuts and coffee, the flight leader and his pilots pour out the details of the day's action to Intelligence. But this session with the interrogating officer is far different from the routine examination of combat personnel. There are many questions and many answers. For the pilots flying those Mustangs today are members of the 8th Air Force's newly-created Scouting Force, a small, select organization whose primary job is to assist in making American pinpoint bombing even more efficient and precise.

The Scouting Force hasn't been in existence very long with the 8th Air Force, although MAAF has had P-38 weather scouts operating for some time (see "Weather or Not" in the December 1944 AIR FORCE—Ed.) But already it has proved its value. The threat of hostile fighters, while still substantial, is not so great as in former days. But weather in the turbulent skies of Europe frequently refuses to conform to the promises of the forecasters. Targets that were visible from 30,000 feet at 1000 hours may be snugly blanketed beneath a 10/10ths overcast by noon. Weather fronts have a perverse habit of suddenly crossing the predetermined routes of the bombers, thereby necessitating time-consuming changes in course and altitude. The Allied weather reporting system, far-flung and efficient as it is, can't foretell what the atmospheric condition will be at all times over a given spot. The result has been many abortive missions involving a waste of energy and fuel and the unprofitable risk of many lives.

The idea for the Britain-based air scouts came from Col. Budd J. Peaslee, a wing commander, from Salinas, Calif. He had been thinking about the weather problem while leading his bombers in an attack against a target in Norway. On this particular day, his formations ran into an undercast while proceeding along the course they had been briefed to follow to the target. The undercast extended all the way to Norway and prevented the bombardiers from making a sighting. Peaslee noted that if they had come in from another direction his bombers would have passed over a few openings in the clouds and a successful first run over the target could have been made.

Peaslee's plan was simple. Accurate, up-to-the-minute reports on weather conditions over the target were urgently needed by the commanders controlling the formations in the bomber stream. In Peaslee's mind, there was only one way of obtaining the desired data. It must be done by an airplane, preferably a fighter or a fast intruder with sufficient range to fly to the target and back. This plane would check weather conditions along the routes and at the target

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JET THREAT

Our Technical Intelligence is keeping a wary eye on these fast Nazi fighters

BY CAPT. ERIC FRIEDHEIM

AIR FORCE Overseas Staff

In the drawing room of a Victorian mansion facing one of London's fashionable West End squares, an American colonel replaces the receiver of a scrambler telephone.

"A 9th Air Force PRU pilot just spotted more than 24 ME262s," the colonel remarks, scribbling a few notes on a memo pad. "They were tailing our bombers near Trier. They didn't attack us, but we're getting more reports of these German jets all the time."

Outside, the noonday traffic surges through the tree-lined street. The drawing room seems an incongruous setting for what goes on within its well-guarded doors. Desks and filing cases have supplanted the tea tables and tapestries, here high-ranking military and technical experts now wage a remote control battle against the latest weapons of the German Air Force. This room contains the nerve center of the American Technical Intelligence whose small but efficient staff keeps sharp watch over what enemy scientists and technicians are preparing to launch against our air forces.

In the early spring of 1945, the casual visitor might question the need of such activity. The Russians are just outside Berlin, and American and British armies are smashing forward from the west. Allied air superiority seems to remain unchallenged in the skies of Europe. Nazi V weapons have failed to throw our military program out of balance and all signs point to a victorious climax at an early date.

Yet the staff of Technical Intelligence feels the job is far from done. Nothing must be taken for granted where the Germans are concerned. Throughout the war, the enemy has demonstrated his ingenuity and resourcefulness by fashioning some new weapon or tactic designed to catch us off our guard. And, explains the colonel who just received word of the 24 or more ME262s over Trier, the Germans now have come up with an airplane that potentially is better than anything we have yet put into combat operations.

He is referring to the Messerschmidt 262 and the Arado 234, two of the Luftwaffe's latest jet-propelled aircraft, both of which have been in operation over the battlezones in recent months. The maximum speed of these planes is not yet known, but it is believed the twin-engined, rocket-nosed ME262 can knife through the air at better than 500 miles an hour. The AR234, also equipped with two jet propulsion units, is rated well above 450.

The U. S. Army Air Forces have not been idle and soon will have jet planes ready that will be as good, if not better, than anything the Luftwaffe has developed. "But," insists the colonel, "the Germans already have some of theirs in operation and quite a lot more are on the way."

That's why Technical Intelligence refuses to relax even though many believe the end of the European war is just around the corner. "We can't take it easy when we know the enemy has something good to throw at us," the colonel says, "Germany might be out of it any day but we are reasonably certain that the Japs will try to adopt most of the best German equipment, including the jet planes."

So far, the enemy's jets haven't given our bombers or fighters too much trouble. 8th Air Force fighter pilots have shot down some with comparative ease, as is testified by the combat report of 1st Lt. Dale E. Karger, who at 19 is believed to be the youngest fighter in the AAF.

"I've always wanted to bring down a jet plane and when my squadron commander and I spotted two of them we went after them," his report says. "They were circling slowly, far above us, so we had to start climbing. It seemed to take ages to get there. I was afraid they would run before we reached them, but they were still around when we levelled off.

"As soon as the two pilots saw us they split and ran. The squadron commander started chasing one and I followed the other. I thought I was out of luck at first because those jet jobs are pretty fast. He began drawing away, but I managed to stay within range after chasing him nearly 50 miles. Finally he began making a wide circle. That was just what I was hoping for. I started to turn inside him.

"I kept closing on him and when I had him in my sights, I fired a short burst and got strikes dead center in his cockpit. Nothing happened for a few seconds, then the pilot crawled out on the wing and slid off. The plane rolled over slowly and dived straight down."

The colonel places Karger's report back into a folder. "We have some more of these, but they don't prove that the jets will be pushovers for our fighters," he says.

Up to February, American fighters have shot down about two dozen German jet-propelled aircraft. The enemy jets, in turn, have bagged several American planes. Despite this superior combat score no one in Technical Intelligence or in the air forces operating in the ETO minimizes the potentialities of the jet fighter, particularly if the Germans decide to shoot the works and send them up in force.

The Luftwaffe's shortage of experienced pilots is reflected in the tactics of some of the jets that have battled with our fighters. As a general rule, the enemy jets have not been aggressive even though they have the advantage of speed. Nevertheless, as was the case with the robot bomb and the

V-2 rocket, the Germans definitely can claim another first with the combat appearance of the jet airplane.

According to the colonel, information at hand shows that the Germans started experiments with jet propulsion aircraft back in 1938 and made sufficient progress to put the Heinkel 280 into the air before the end of that year. For a number of reasons, they didn't do much with this plane. For one thing, Luftwaffe pilots at that time were being trained for the standard military types and those who could be spared for the jet experiments found the 280 difficult to manage.

Bugs also developed in the engines, and the Nazi High Command decided that the FW190 and the ME109 would be sufficient to see Germany through the war.

Last year, however, the Germans had a change of heart. The war was going badly and Allied aircraft were gradually increasing their superiority over the Luftwaffe types. Something had to be done and the Luftwaffe chiefs called a meeting in Berlin. They demanded the immediate production of jet fighters.

"But we learned that the German Fuel Control Board was against it," the colonel says. "They were having their hands full after our strategic air attacks on the oil industry. The Board told the Luftwaffe it had missed the boat and should have started building jets two years earlier."

By the spring of 1944, however, American and British air activity became so intense that the Luftwaffe chiefs won their point. Orders were issued for the immediate development of the jet industry.

Work was initiated on several types of engines—one known as the Leist ZTL and sponsored by Daimler Benz. Another was the Heinkel Hirth and a third was the Jumo 004. Apparently the Leist engine was abandoned.

The ME262 is formidably armed, being designed to carry four 30 mm guns. It can also carry bombs on the side of the fuselage. The AR234, being a larger plane, can load more fuel and thus has a substantially greater cruising range than the 262. While transporting bombs, its range is about half its potential.

Technical Intelligence works closely with the British in dissecting parts of German jet planes that have crashed or been shot down inside the Allied lines. "We also have a continuing interchange of information," the colonel adds. "This comes in from many sources and every little bit helps in determining the strength and performance of the Luftwaffe's jet force."

Best estimates available at present indicate that the harassed German production facilities will be unable to turn out jet aircraft in sufficient quantities to do much damage. On the bases of known production figures, it is unlikely that the Luftwaffe will have more than five percent of its front line aircraft converted to jet types by this spring. Jets normally require longer take-offs than standard fighters, although they can get into the air with the assistance of rocket take-off devices. With her territory diminishing daily, Germany does not have very many airfields suited for jet plane operations.

But like everyone else in Technical Intelligence, the colonel prefers to keep his fingers crossed.

"If we relax even for a couple of weeks the story may be different," he insists. "At present our fighters are holding their own against the superior speed of the jets. New equipment on our planes partly compensates for the speed differential. From what we know, the jet isn't quite as maneuverable as some of our fighters. But if the Germans threw jets at us in heavy force we'd have a tough fight on our hands." ☆

Above and right are silhouettes of the Messerschmidt 262.

Distressed ME262 has wheels down, later crashed in flames.

Guns and gun camera of P-51 caught this ME262.

Below and left are silhouettes of the Arado 234.

AIRLINE ACROSS AFRICA

An Air Force Overseas Staff Correspondent

ILLUSTRATED BY CPL. LOUIS S. GLANZMAN

Neither lions nor leopards, harboobs nor harmattans, prevent the planes of ATC's Central African Division from moving through on schedule

The new copilot of the C-46 shook his head as if there were a bee in the earphones and then looked at the man on his left. But the pilot's attention was fixed on the sky ahead of them. He did not seem to have heard the message. The copilot wondered if he had been hearing things.

"This is Abel 617," said the copilot, "Abel 617 calling Accra Tower. Will you repeat the weather?"

"This is Accra Tower calling Abel 617. Weather here is ceiling unlimited with visibility zero."

"Ceiling unlimited with visibility zero," the copilot echoed into the hand mike in a dazed voice.

The pilot nodded and grinned a not too happy smile as he swung the Air Transport Command plane onto a different course and headed for another field. It was one of the lessons in weather that pilots on CEAD (Central African Division of ATC) have to learn. For there is plenty of freak weather all over CEAD's route, which covers most of South Africa as well as Central Africa. Other airlines, knowing that in the afternoon in this area airmen encounter giant cumulus clouds and storms, do almost all their flying in the morning. But the ATC flies and has flown 24 hours a day, every day of the year.

One pilot who got caught in a typical late-afternoon storm fortunately had enough altitude. He dropped 3,000 feet like a stone in a vacuum. He pulled back on the stick. Then he hit a draft going in the opposite direction and shot up 5,000 feet. The jolt knocked off both wingtips but the pilot did not know that until he made a perfect landing at his destination and got out and looked at the plane. "I thought it flew a bit funny," he explained, "but only on the landing."

While such storms are daily occurrences, ceiling unlimited and visibility zero is a seasonal condition and is called a "harmattan." A harmattan occurs after a cold spell when the dust rising off the Great Sahara Desert blows south and west to meet the moisture-laden air of the African Atlantic coast. The moisture absorbs the dust and remains suspended at times to a height of 10,000 feet. Often it will last several days and extend 400 miles out to sea and far enough inland to cover half of the flying route.

There is even an African improvement on the harmattan. This is the "harboobs." As the colonel in charge of operations for CEAD described it, "When one is coming up you bolt the windows, lock the door, stuff rags and papers in the crevices, crawl into bed and pull the sheets and blankets over your head. That way you get only a half-inch of sand inside the sheets." For the harboobs is the same as the harmattan except that the wind is as strong as a local tornado and the grit so fine it seems to go right through walls.

Despite this and other things like 130° temperatures, CEAD set up a record that has not been surpassed by any other ATC division when it flew 13 months without a single fatal transport accident. According to the heads of this division, such an accomplishment is due to two things: the excellence of the pilots and the high morale of all the personnel, especially the ground men.

To make him good, every new pilot is given intensive training along the same lines as that given by commercial air lines in the U. S. although, of necessity, it is speeded up. Each man flies as copilot three to four months to learn routes, weather, etc., of his run. He will fly only his own run which may be anywhere from 1,600 to 2,500 miles. The older flyer is eager for the younger one to learn rapidly and thoroughly. Rapidly, because only by training replacements will the old pilots get home. Thoroughly, because imperfect knowledge in the pupil will be held against the instructor. After finishing his spell as copilot, the flyer goes to an intensive instrument finishing school at Accra for three weeks. During this period he gets a thorough refresher course in instruments and he puts on overalls to work in the line until he knows the plane as well as do the mechs he's working with. Every pilot, regardless of his previous experience, goes through this school.

Pet leopard likes his back scratched.

CEAD'S fine maintenance record is due primarily to morale —to the fact that all individuals have a personal and honest realization that each is an important part of every airplane flying the run. This attitude starts at the main depot at Accra, which supplies all of Africa and has the only complete engine rebuilding shop on the whole continent. Pride goes right down the line to the smaller stations such as the emergency field at Salalanin, Saudi Arabia, which is ruled by the Sultan of Muscat. The sul-

tan has rather fixed ideas about his sovereignty and refuses to let the Stars and Stripes fly from this post—probably the only U. S. base in the world that doesn't. At Masira Island, supplies can be shipped in only seven months a year due to the monsoons. At El Geneina in French Equatorial Africa, the nearest railhead is at El Obeid, some 765 miles over the desert on roads the rain washes away half the year.

This probably helps explain why the men at places like Maiduguri in Nigeria—368 miles by truck over one of the roughest roads in the world—went in for raising pet leopards. Even after the animals were full-grown they loved having their backs scratched, and the local sport was to have them enter a newcomer's quarters. The cost of repairing screened windows was high, but everyone thought it well worth while until a high official was forced to make a hasty exit when he saw two wild beasts bearing down on him for the kill. It did no good for the men to explain that those were purrs and not roars. . . . The leopards became skins.

The most difficult problems are the climate and the fact that there are no stations in the division where a man can be rotated to get a change and to see something of civilization. Even on ATC runs in the Central Pacific, men can be rotated from the coral atolls to Hawaii. But in CEAD the climatic conditions and amount of civilization vary only a few degrees. Even the fact the men can supplement their rations by hunting animals that millionaires used to travel thousands of miles to shoot, loses its interest. As one GI explained it "A zebra quickly becomes just a horse in a bathing suit and a lion is something you only want to see in a film announcing a Hedy Lamarr picture." For that reason a leave area was set up in Johannesburg, in the Union of South Africa. To this ultra-modern city, flying personnel, both officers and enlisted men, are supposed to go after six to eight months operational duty. Ground personnel get this privilege after 12 months. However it is generally twice as long before the men get the pleasure of standing on a corner watching street cars go by or being able to ride two miles without being in a jungle or desert. (It should be remembered that all of this applies not only to ATC personnel, but also to two organizations as vital to the run as the planes—the AACS and the Weather units.)

Men return refreshed to their work—work that covers everything on an airbase. Since there is no theater command, CEAD establishes, maintains and operates all of its bases from engineering to base maintenance, QM, PM, ordnance, signal, CW, messing, billeting, PX, etc. Where other ATC divisions can fall back on the theater when something goes wrong, CEAD must do it all. Of course they have natives to help, but for a while it appeared that none of the local citizens would work, no matter what the pay. For someone in Washington refused to pass on a small requisition which explained truthfully that the money was needed for native orchestras to play during the day. It had to be pointed out carefully to the official that the orchestra consisted of two one-stringed violins, two one-stringed guitars and a couple of gourds, and that the natives refuse to cut down elephant grass, repair runways or do any other mass work without being able to sing in time to their orchestras.

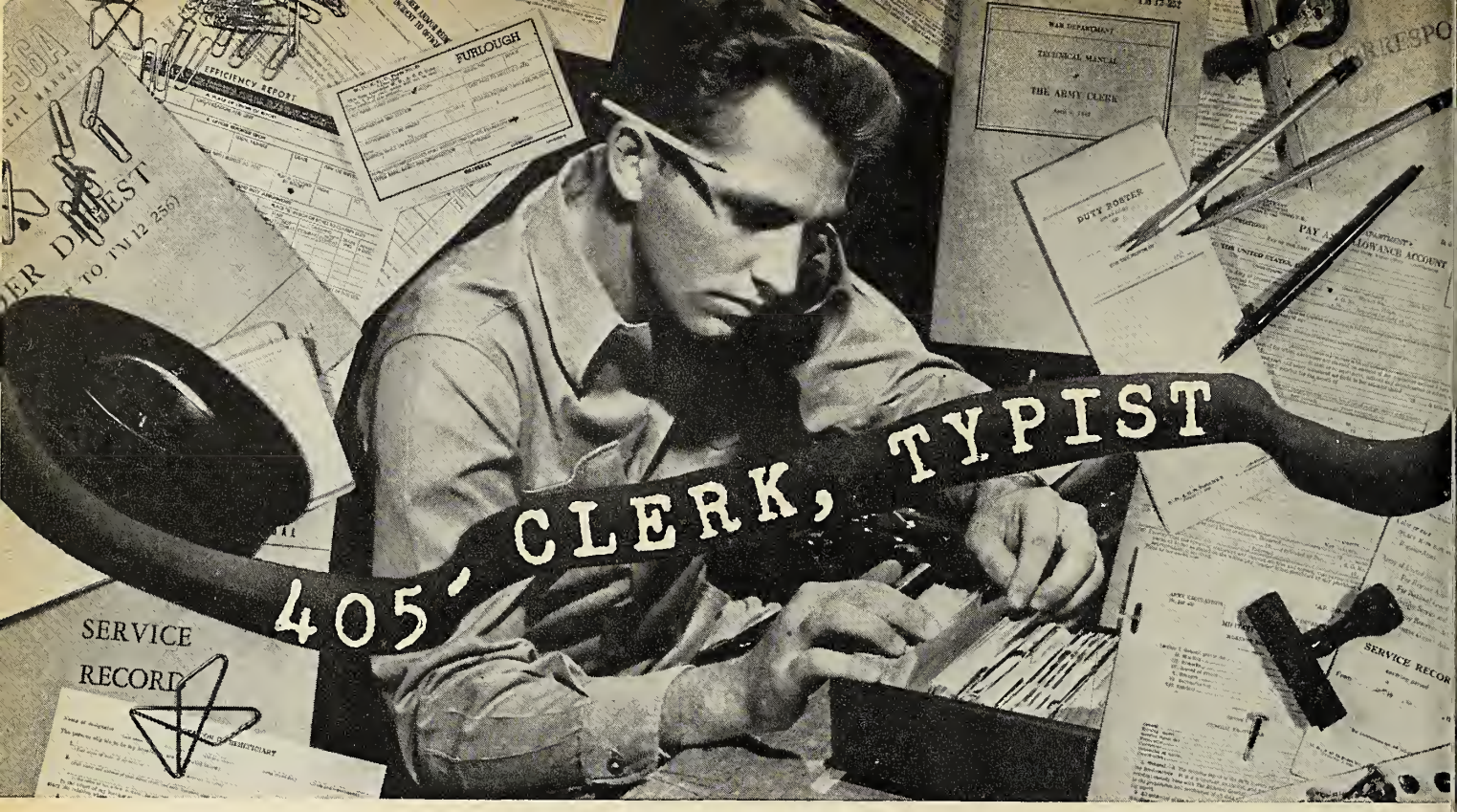
CEAD is an air route filled with typical "believe it or not's" as one pilot discovered when he had to fly instruments for two hours and make a blind landing on a day when the weather was CAVU. He had run into a cloud of locusts and the windshields were black.

Hop in bed, pull up the sheets when this harboob strikes.

Each station has something different about it. Aden is famous in Biblical history. At Aden, Noah is said to have built his ark. At the old Crater City are the large baths attributed to the bathing beauty of her day—the Queen of Sheba. At Kano, another station, a native blows an eight-foot horn—the type used at the walls of Jericho—before each plane lands or takes-off to warn the natives working on the field and, more important, to scare the birds on the runways.

All of this adds up to one of the most important links not only for ATC but for all of the air forces in CBI. Over this run, in addition to freight and passengers, CEAD has handled more than 4,000 combat planes of all types. In the territory that made Stanley and Livingstone famous, the men of CEAD are doing a job and building a lifeline that will play a large part in the final defeat of Japan. ☆

Line shows main ATC routes. CEAD flies from Accra to Asmara, then east.



The whole business of fighting a war goes through his typewriter before a shot is fired—but he wins no medals and little thanks

BY MAJ. LUTHER DAVIS

AIR FORCE *Staff*

The bar was noisy with a variety of servicemen arguing heatedly about things that had happened to them overseas. One corporal had a lot to say about his personal battle with Von Rundstedt and an Air Force sergeant told all hands about a day over Regensburg. The corporal's refrain, "So I threw a hand grenade and waited," kept getting mixed up with the sergeant's tag-line: "FW-190s! FW-190s everywhere you could see!"

Alone in the midst of all this reminiscence stood one sandy-haired young sergeant who just sipped his beer and listened. On his sleeve were hashmarks indicating two and a half years overseas, but on his chest all he wore was the Asiatic Theater ribbon. Perhaps he was thinking:

"St. Mere Eglise, eh? No, I wasn't there. Guadalcanal, Leyte, the first Tokyo raid—no, I wasn't there either. Chairborne, that's me. They carried me to Australia and sat me at a typewriter. Every second week I got a day off and went for long walks. But most of the time I sat. Sat and typed. Reply by indorsement. Approved. Attention is invited. The following secret documents are transmitted herewith. Me, I was at a headquarters all the time. I'm lucky. Two and a half years over there and no one ever shot at me. And I never shot at anybody else. Hell, I wasn't really in the war."

In the AAF there are 337,000 men assigned specifically to administrative work, and a great many more who actually do it. Many of these men must think somewhat along the lines of the sergeant alone in the bar. They are the men who've fought their war with Typewriters, Desk, Standard, wondering if what they're doing affects the war at all. Lots of them have been bombed and strafed. Some have been killed. But even when they experience enemy action they have to sit there and take it. They rarely get a chance to fight back.

The papers slide over their desks in posts smack on the equator where they have to put talcum powder on their hands and arms to keep from rubbing all the ink off the papers; in underground shelters north of Nome they work through the arctic twilight with feet on top of kerosene stoves and fingers blue from cold. They realize that the inconvenience they endure is nothing compared to the violent hardships of combat troops—they keep telling themselves that, but all the time there's the boredom and monotony of the carefully trite official correspondence—and a guilty feeling that they're not contributing to the war.

Well, without them we could give up now. Without the steady clack clack of thousands of typewriters there'd be no spare parts and no replacement airplanes; no rotation policy, no troop movements, no pay, no courts martial, no uniforms, no gasoline; there'd be no duty rosters and no overnight passes, no PXs and no .50 caliber ammunition—or guns. There'd be no promotion on either side of the ocean, no food, no war—no victory.

They've made the AAF one of the most efficiently administered organizations in the world, even though they didn't always know what their work proved. By diligence, application, sweat, and the peculiar kind of guts that keep a man doing a hated chore until he's ready to vomit, they've laid the groundwork for the bombing of Berlin and Tokyo. This they've done and continue to do that others may fight.

They're guys who stood next to you at induction center and felt the same emotions you did—were just as ready as you to take whatever came, combat or kitchen police. They're good soldiers who do what they're told knowing they're lucky in lots of ways, but who, for the most part, devoutly wish they weren't. ☆

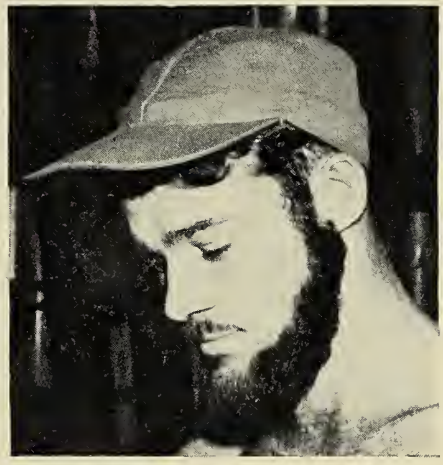
The Beard...

. . . will be neatly trimmed and the hair kept short.

Par. 7, AR 40-205.

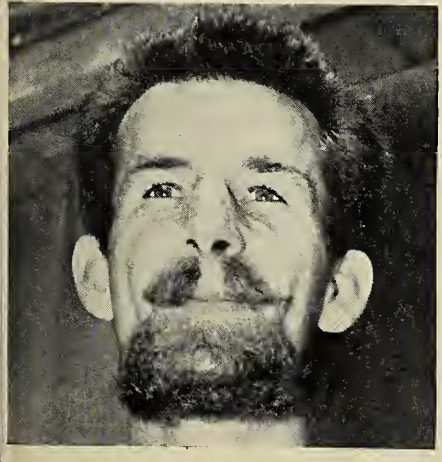
The Hair Force Special
Pfc. L. W. Clemmons, Marianas.

The Bushwacker
M/Sgt. C. B. Phillips, Munda.



The Lunatic Fringe
S/Sgt. D. Blakeslee, Australia.

The Yukon Grow One Too
Cpl. C. Popoff, Alaska.



The Eager Beaver's Beaver
Pvt. M. W. Payne, Kwajalein.

The Wac Scratcher
M/Sgt. G. E. Green, Solomons.

The Wirehaired Terror
Maj. Lou Kittel, Guadalcanal.

The road back t

By the time the Army Air Forces had completed the job, Clark Field, once the aerial pearl of the Orient, was little more than a shambles.

AAF heavy bombers first struck Clark Field December 22.

Hangars were twisted skeletons, planes wrecked, runways shell cratered.

Clark Field

The 5th Air Force has come home.
—home after a three-year aerial odyssey of 8,000 miles
—home via the long hard road of Moresby, the Battle of the Coral Sea, Buna, Gona, Lae and the Battle of the Bismarck Sea, Hollandia, Biak, Morotai, Leyte
—home to CLARK FIELD.

Clark Air Center, 50 miles into the rolling plains of Central Luzon, north of Manila, was the U. S. fortress for the air defense of the Philippines. It fell into Jap hands in December 1941.

It wasn't until December three years later that the first bombs of the 5th Air Force heavies fell on the Japs at Clark, the first installment of a debt they had vowed to pay in blood and destruction.

During their occupation of Clark Air Center, the Japs had developed it as the strongest link in a chain of airbases from Japan deep into the Pacific and Netherland East Indies. The Air Center comprised 6 airdromes and 13 runways.

Despite heavy attacks by Naval carrier planes coordinated with the Leyte landings in October, 1944, mid-December still found Clark Air Center the hub of Jap air operations.

The first attack by our land-based aircraft against Clark came on December 22 . . . From that date, until January 9, when our troops landed at Lingayen, in northern Luzon, Clark Air Center was under almost daily attack by heavies of the 5th Air Force, escorted by fighters and joined by low flying A-20s and B-25s. In these operations 139 out of 203 enemy interceptors were shot down, a minimum of 228 Jap planes was destroyed on the ground; our losses were seven fighters and eleven bombers.

One of the main objectives of our forces that landed at Lingayen was a march south down the Central Luzon Plains to Clark Air Center and Manila. It was important to the success of this operation that the strong Japanese forces in southern Luzon be isolated and that supplies be cut off from moving northward. This job was done with a vengeance by an Assault Air Task Force of the 5th Air Force.

Using A-20s, B-25s, plus almost every type of fighter and fighter bomber type in the AAF, the Third Air Assault Task Force strafed and bombed this strategic area daily from dawn till dusk. During a period of two weeks this force destroyed or rendered useless 330 trucks, 51 staff cars, 196 railroad cars, 11 locomotives, 13 tanks, 4 half tracks and miscellaneous artillery pieces, motorcycles and other vehicles.

The war against the Jap isn't over, there is still fierce fighting in the Philippines, but today the 5th Air Force is fighting from its home ground. Its slate has been wiped clean and from now on the 5th will see to it that the score is kept one-sided. ☆

More than 400 Jap planes were caught on the ground and destroyed. Clark's 13 landing strips were being readied for U. S. use even before Manila was liberated.

Prior to taking Clark Field, 5th Air Force planes struck at Luzon communications daily.

Filipinos directed low-flying pilots to juicy Jap targets.

Strafing and bombing missions were at times carried out at altitudes so low that several of our attacking airplanes were destroyed by Japanese land mines.

FOXHOLE MEDICS

By an Air Force Overseas Staff Correspondent

Operating under fire, AAF portable hospitals save lives by fast action on the battlefront

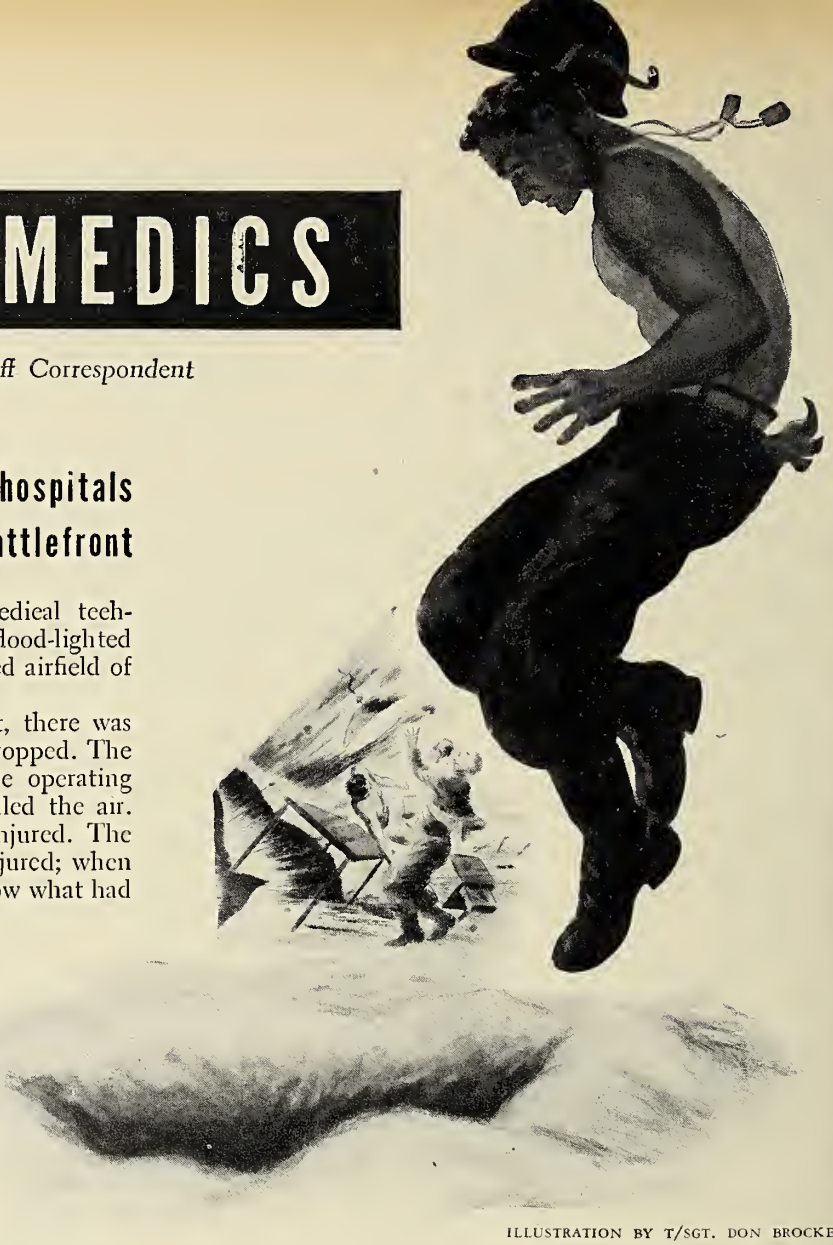


ILLUSTRATION BY T/SGT. DON BROCKELL

A medical officer assisted by two enlisted medical technicians was performing an operation in a flood-lighted tent. Less than 1,000 yards away an advanced airfield of the 5th Air Force was under enemy air attack.

Suddenly a plane swooped low over the tent, there was the familiar and ominous "whoosh" as bombs dropped. The medics dropped into their foxholes next to the operating table. The earth shook and bomb fragments filled the air. Both the doctor and his two assistants were injured. The patient was bounced off the table, but was uninjured; when he came out of the anesthesia he didn't even know what had happened.

"It's a funny thing," commented Maj. Wilfred F. Ruggiero, MC, "but we've had several cases where the condition of a patient under treatment did not permit removing him to a foxhole. I can't recall a single case of injury to the patient under such circumstances.

"Our experience has been that it is best to halt an operation when bombs start to drop. If the surgeon were to be injured or knocked out while continuing the operation, the result probably would be disastrous. Precautions, of course, are taken to assure that the patient is all right from a medical standpoint during the seconds or minutes of actual attack."

Major Ruggiero is commanding officer of the 29th Air Force Portable Surgical Hospital, one of five attached to the 5th Air Force in the Southwest Pacific. They are tailor-made to meet the unique hospital requirements of Lt. Gen. George C. Kenney's lightning-like aerial leap-frogging operations.

Due to the fact that the Southwest Pacific air war is fought from bases in the most advanced areas, where no permanent or even semi-permanent medical facilities are available, and in jungle country prohibiting immediate evacuation of seriously wounded, the need arose for a new kind of field hospital. Several specifications were set forth for a hospital that would become an integral part of the advancing Air Forces:

1. It must be highly mobile.
2. It must be capable of being set up to function within a few hours.
3. It must be able to perform routine medical services as well as all types of major surgery.
4. It must be self-sufficient for a period of at least 30 days.

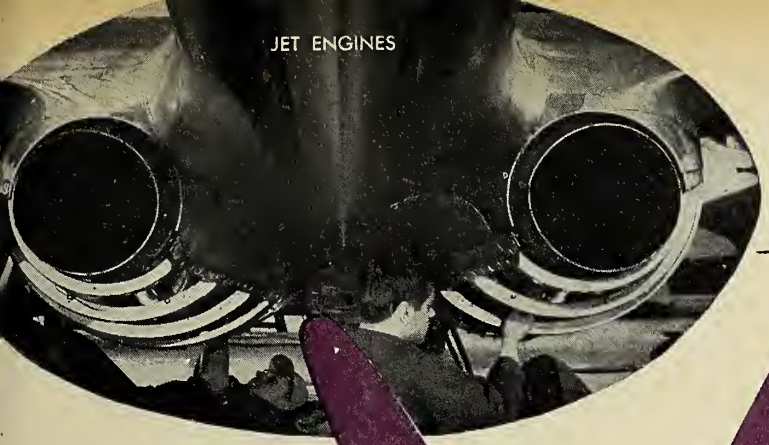
Fortunately a hospital unit existed within the Medical Corps that lent itself to modification for this purpose. These were the portable surgical hospitals originally designed for infantry needs at the front lines, which were used as the prototype for the new type air force field hospital.

These have moved right in with every air advance from Buna to the Philippines. Often they come in before an airstrip is completed, ahead of the major complement of combat air units. As the terrain rarely permits adequate wheeled transportation, they are usually located 1,000 yards or less from the airstrip.

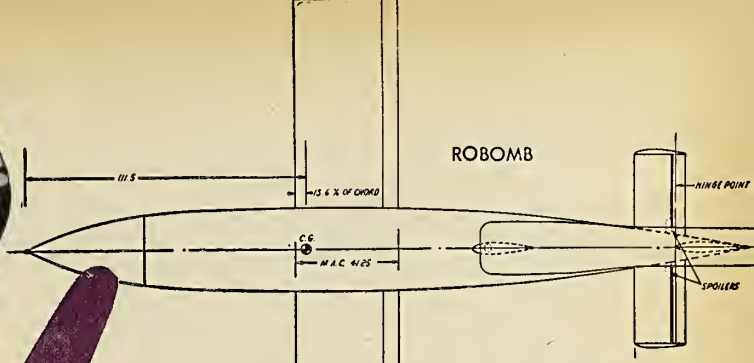
At Cape Gloucester, for instance, the air force portable hospital was located directly behind the Marine unit holding a precarious perimeter against the Jap. One morning the hospital staff discovered that the Marines had pulled back during the night and left them to hold the perimeter, with nothing but empty gun positions and barbed wire between the hospital and the enemy. For cases such as this, the hospital, in accordance with the Geneva Convention, carries enough small arms and ammunition to defend itself and its patients. The hospital carries no Red Cross identification of sufficient prominence to reveal its location to the enemy, as it operates with combat units; it expects no mercy from Jap bombing or sniping, both of which they have been subjected to on numerous occasions.

The commanding officer of an air force portable hospital

(*Continued on Page 57*)

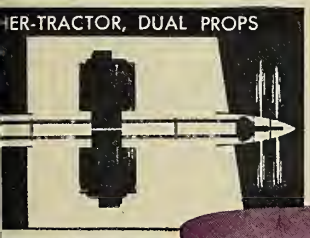


JET ENGINES

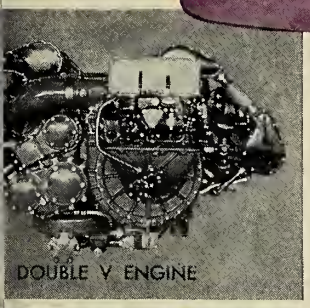


DESIGN:

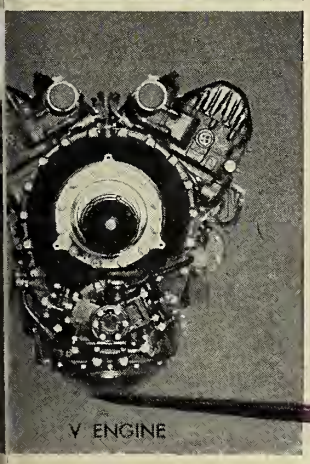
Key to air superiority—part 2



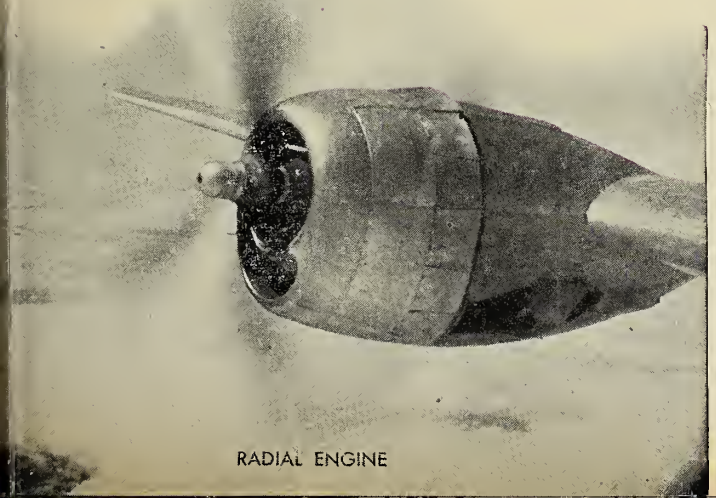
ER-TRACTOR, DUAL PROPS



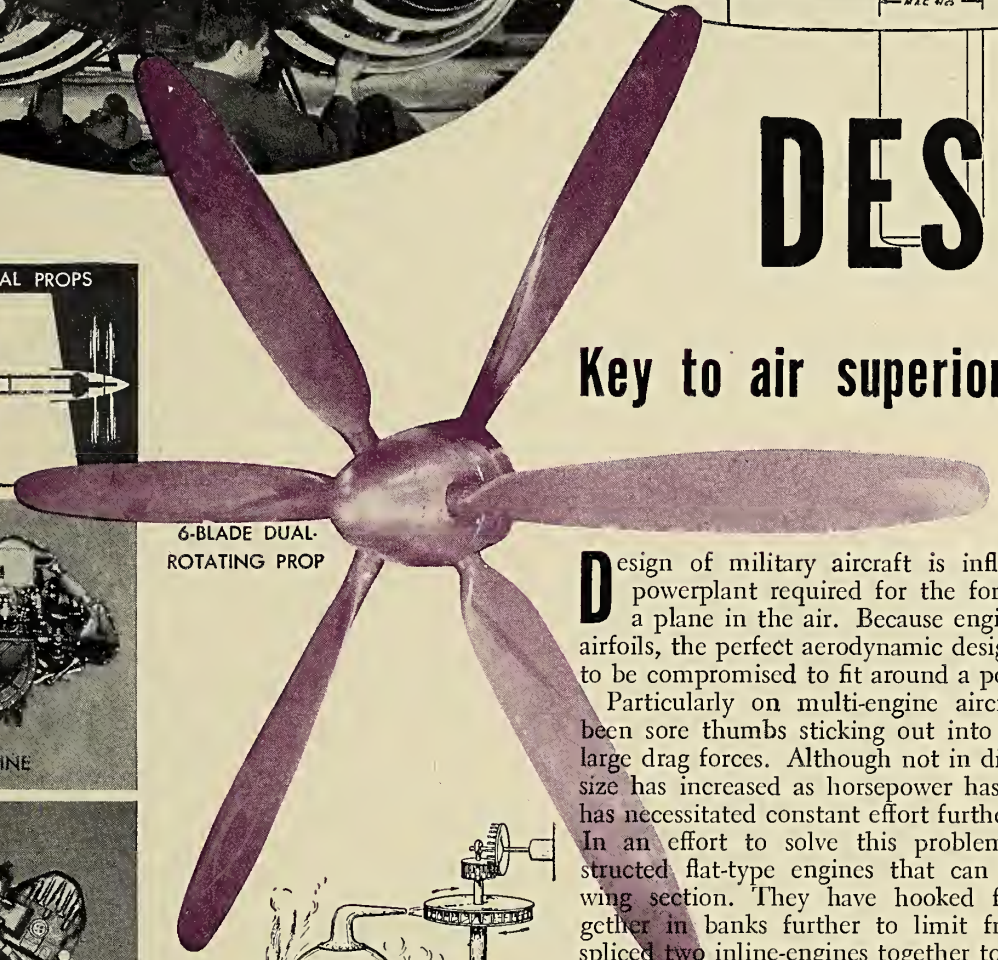
DOUBLE V ENGINE



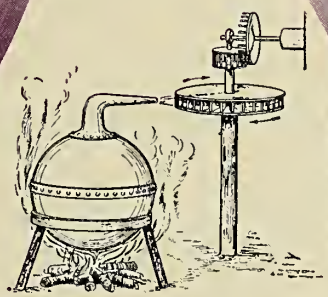
V ENGINE



RADIAL ENGINE



6-BLADE DUAL-ROTATING PROP



EARLY TURBINE (1629)

P-59

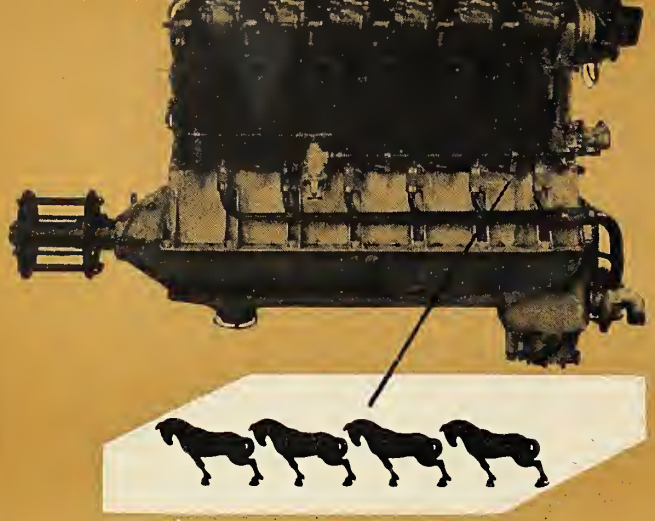
Design of military aircraft is influenced greatly by the powerplant required for the forward thrust that keeps a plane in the air. Because engines are not shaped like airfoils, the perfect aerodynamic design traditionally has had to be compromised to fit around a power unit.

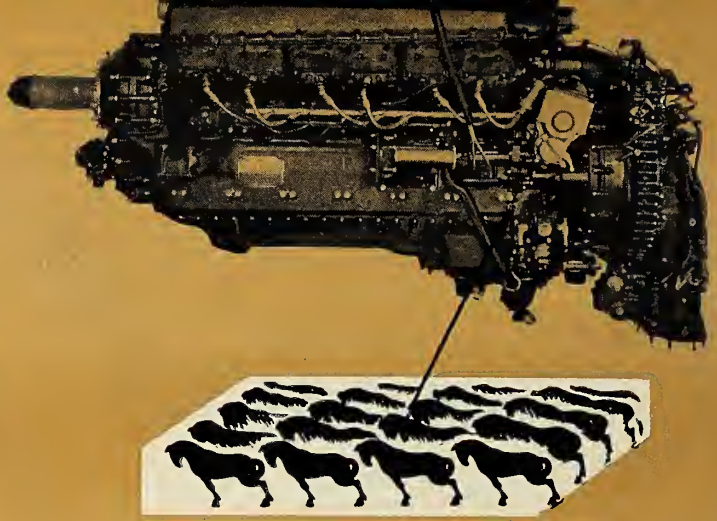
Particularly on multi-engine aircraft, powerplants have been sore thumbs sticking out into the airstream, creating large drag forces. Although not in direct proportion, engine size has increased as horsepower has been stepped up; this has necessitated constant effort further to decrease drag area. In an effort to solve this problem, designers have constructed flat-type engines that can be buried inside of a wing section. They have hooked four radial engines together in banks further to limit frontal area. They have spliced two inline-engines together to form a W. Some new aircraft are being built around these types of engines, but the future of burying the conventional engine inside the wing section does not appear very promising except in large flying wing designs.

Most promising aircraft powerplant is the gas turbine engine—not complicated by hundreds of reciprocating parts and relatively free of cooling problems. One type of gas turbine drives a propeller to obtain primary thrust while another type gets its thrust from jet reaction, eliminating the propeller. Such engines are greatly influencing design.

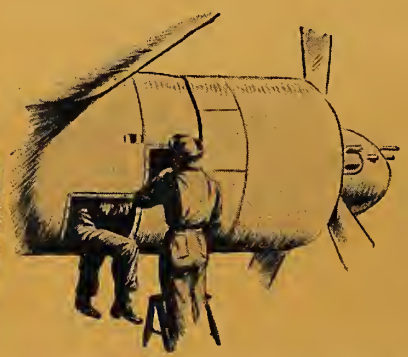
With application of the gas turbine, the outlook is brighter for tailoring engine installations to the needs of aircraft design instead of tailoring aircraft design to the shape of the conventional type powerplant. This should mean development of better aerodynamically designed aircraft.

Propellers, the other integral component of conventional powerplants, have been redesigned to absorb the power of larger engines and thus to produce greater thrust and have been geared to extension shafts from buried engines. Such development has seen the evolution from the single two-bladed prop to twin three-bladed dual-rotation props driven by conventional reciprocating engines. Although generally regarded as impractical for supersonic speeds and stratosphere flights, propellers will continue to be utilized for aircraft operating at subsonic speeds. Another type of propeller development is evident in the helicopter rotor blades which produce both lift and horizontal thrust.

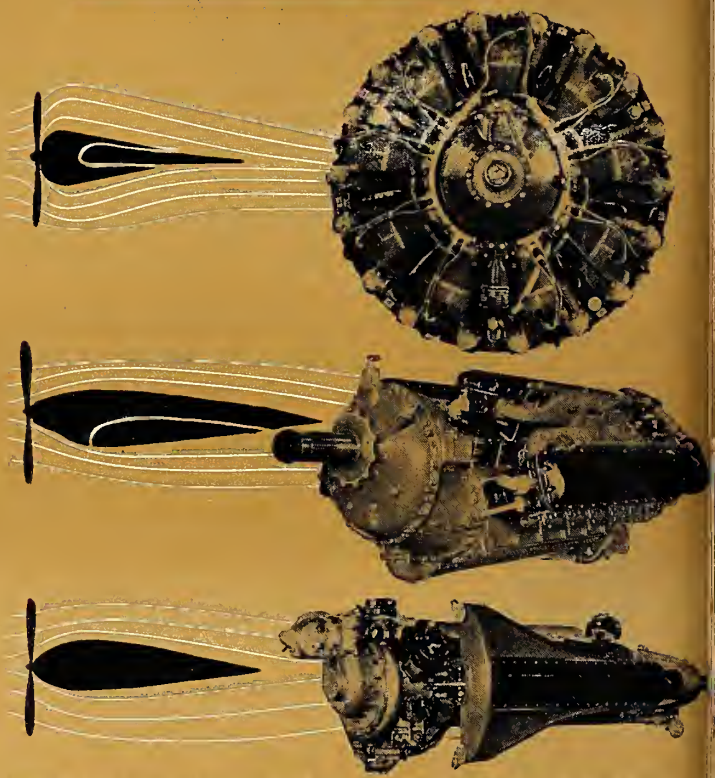




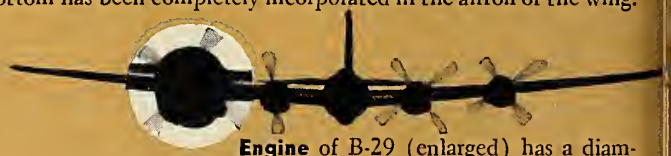
Principal objective in power plant design is maximum horsepower with minimum displacement in cubic inches. Modern inline engine at right is approximately the same size as the old-type Liberty "12" (above) but is able to furnish about four times as much horsepower.



Accessibility for maintenance work, as in the A-26, is important design factor.



Trend is toward streamlining of engine nacelles. Radial installation at top has more drag than inline engine (center) while flat type shown at bottom has been completely incorporated in the airfoil of the wing.



Engine of B-29 (enlarged) has a diameter greatly exceeding wing thickness.

In measuring progress of conventional aireraft engine design between World War I and II, it is impressive to compare the Liberty V-12 with the Packard Merlin 12 cylinder engine. Both are the same size, having a displacement of 1650 cubic inches, but the Merlin produces four times as much power. By the weight yardstick, although the Merlin is twice as heavy as the Liberty, there is more than 100 percent increase in power output per pound. The Liberty had a ratio of more than two pounds of engine per horsepower; the Merlin less than a pound per horsepower.

Despite progress in consolidating more power into smaller and lighter units, advances in wing-loading and thin wing development still are ahead of reduction in powerplant size.

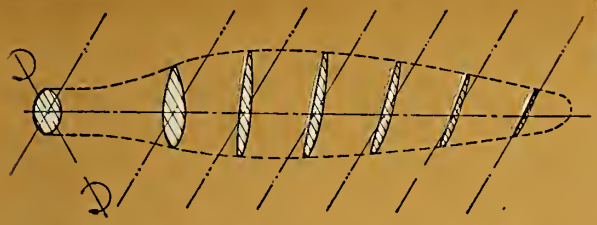
Experimental engines in the 2,000 to 4,000 horsepower range have been built in many strange forms—corn-cob, X-shaped, and H-shaped—to facilitate their installation in planes and to present a minimum of frontal area to the airstream. One corn-cob type has 42 cylinders but is only 38 inches in diameter.

In addition to the drag problems involved in powerplant design and installation, present aircraft must be provided with quick-change powerplants that also assure ready accessibility for maintenance. Such provisions exert an influence on overall design, especially in the location of equipment.

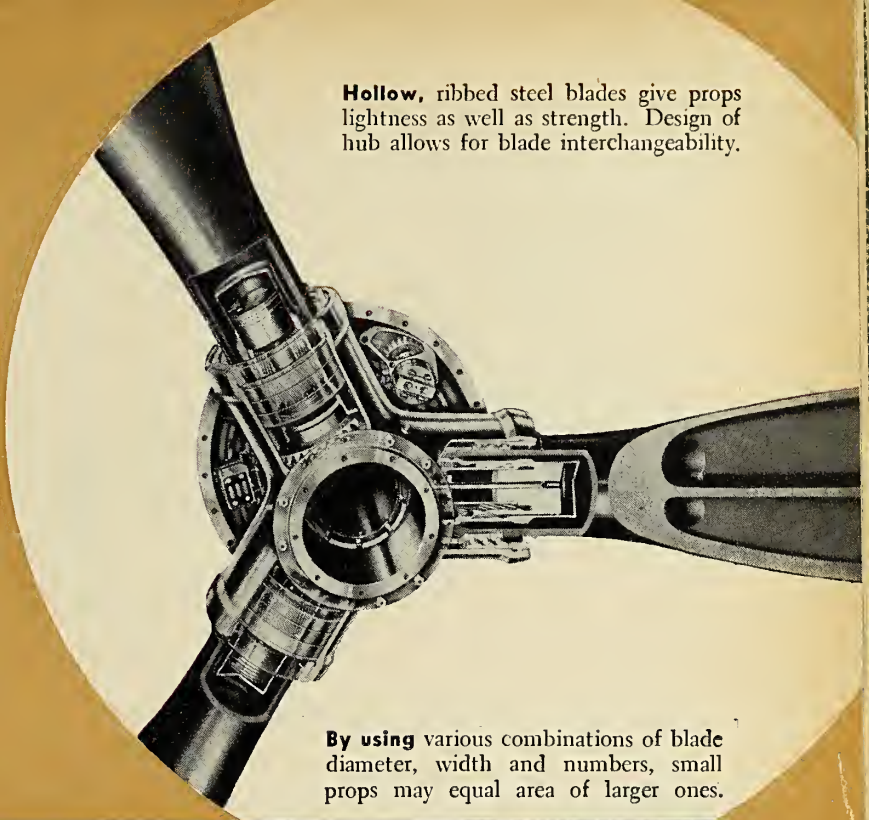
Another major drag problem that is being tackled by designers in their attempts to increase performance efficiency is the proper handling of airflow internally. For example, inlet and outlet air ducts are being redesigned to receive, circulate and exhaust air with the least possible disturbance of airflow around the plane and with a minimum of accessory cooling equipment.

In attempts to improve internal air handling, some ducting systems have been arranged so the exhausting air imparts a small jet thrust. Careful design of the exhaust stacks on the Merlin engine, for example, has enabled planes to pick up as much as 35 mph from the jet-like reaction imparted by ejected exhaust gases. Exhaust blasts from the supercharger of a P-38 eject at right angles to the course of flight so the jet thrust is not used and consequently speed is not increased. Installation of a turbo hood to align the exhaust blast with the airstream was tested and found to give the P-38 an auxiliary forward thrust. This test later led to the angular installation of the P-47 turbo-supercharger so that the exhaust blast could add some jet thrust.

Trend in propeller design shows a full cycle. Broad tips of early wooden prop (top) are again in style on P-51 (bottom) after long disfavor.

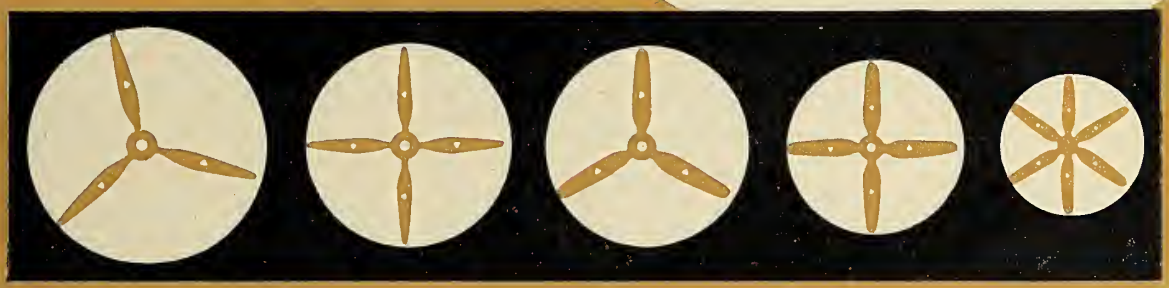


Blade angle of a prop varies along length of blade to give most efficiency in providing forward thrust.



Hollow, ribbed steel blades give props lightness as well as strength. Design of hub allows for blade interchangeability.

By using various combinations of blade diameter, width and numbers, small props may equal area of larger ones.



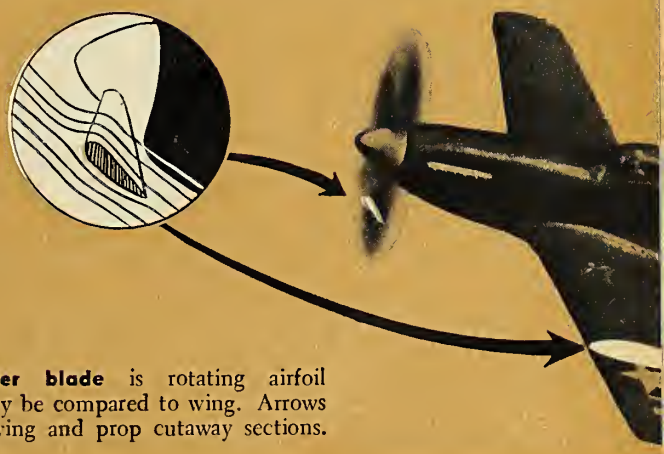
As more horsepower has been built into engines, larger and larger propellers have been developed to convert this power into thrust. But there are limits to the diameter of a propeller that can be mounted on an aircraft. Instead of extending blade diameter, the width and number of blades can be increased to give the propeller more total blade area.

Today, our high-performance propellers have four blades. Some British props are five bladed. Dual-rotation props have six and eight blades. Such combinations increase total blade area but do not increase diameter of the propeller and can be used on planes with relatively short landing gears.

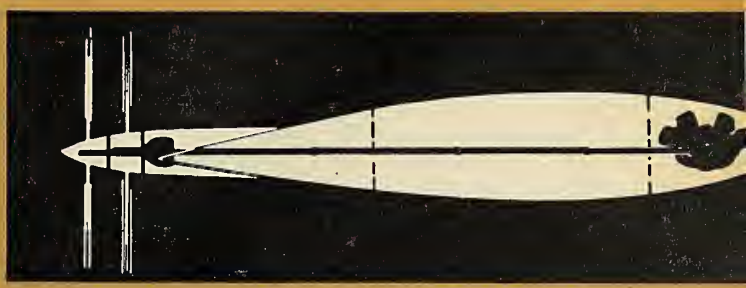
A further trend in propeller design has been to the stubby-end paddle blade, which provides additional blade area. This change has increased the power-converting ability of our propellers.

With development of the gas turbine engine for aircraft, basic design problems of the conventional propeller have not been greatly affected. To transmit the power from a gas turbine unit into the propeller, a reduction gear system is required, but the shapes and numbers of blades still are determined by the amount of power to be harnessed and the speeds and altitude of operation to be encountered. This turbine-propeller powerplant not only eliminates the internal combustion engine, but retains the advantages of short take-off runs.

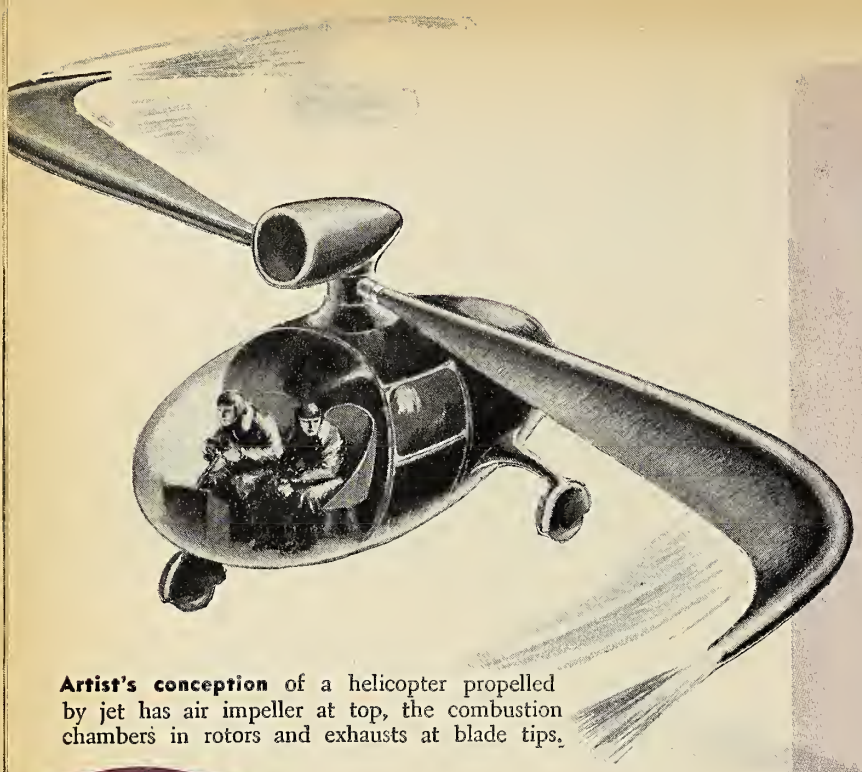
If the gas turbine ejects its exhausts directly into the air, instead of transmitting its power to a propeller, the airplane becomes jet propelled. This type of installation eliminates propeller and reduction gears as well as the internal combustion engine. At very high speeds, where propeller efficiency falls off, jet engines become more efficient.



Propeller blade is rotating airfoil and may be compared to wing. Arrows show wing and prop cutaway sections.



With shaft, dual pusher props can be driven by engine placed forward.



Artist's conception of a helicopter propelled by jet has air impeller at top, the combustion chambers in rotors and exhausts at blade tips.

One of the earliest demonstrations of jet principle was Hero's aeolipile, which converted steam pressure into mechanical force in days of Alexandrian culture.

DESIGN

XR-1 Platt-LePage helicopter has rotors which operate from central power plant situated in fuselage.

Jet engine on P-59, below, has simplified the work of maintenance personnel as well as plane designers. Props and reciprocating engine parts are eliminated.

A different adaptation of propeller design is that for helicopter rotor blades. These blades are rotating wings that can be tilted to provide forward thrust as well as vertical lift. Current rotor development tends toward a more efficient rotor blade system that can lift heavier aircraft and propel them faster.

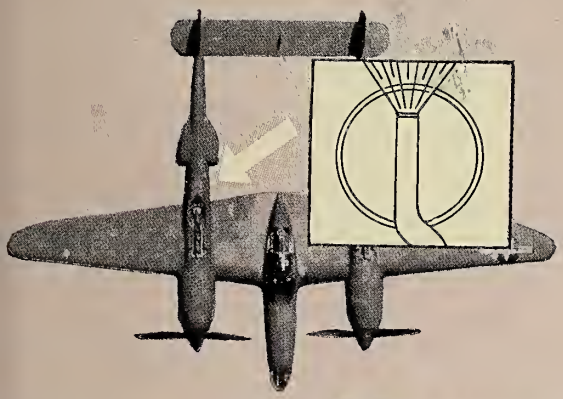
Essentially, the helicopter obtains both lift and forward thrust from its rotor—a series of airfoils. However, instead of relying on forward speed to obtain lift from these wing surfaces, it rotates them at sufficient speed to obtain vertical lift without forward motion. Then, to fly in any given direction, the rotor is tilted in that direction, thus producing thrust as a propeller and produeing lift as a wing.

In contrast to this method of flight, the autogyro uses a conventional propeller-engine combination for forward speed and utilizes its rotating wings for lift only.

With the trend to larger helicopters, new types of rotor designs are being developed to provide the maximum lift and forward thrust with a minimum of interference with stability. Dual rotation rotors may be mounted on the same drive shaft. Single rotors may be supported on long arms like those of the R-1, or at the front and rear of the aircraft. They can be intermeshed at an angle like an egg beater or in the same plane as a set of gears.

Adaptation of the principles of jet propulsion to the helicopter may increase its efficiency. By ducting hot gases from a gas turbine engine out of the tip of a rotor blade, the blade could be turned by jet propulsion.

P-59 was first AAF jet plane, now is being put in the trainer class by the new P-80. At left, Airacomet has twin jet engines hugging fuselage.



By changing direction of supercharger exhaust on P-38 from side to rear, the plane receives an added forward thrust.

Robomb is modern application of power produced by jet. This model has shortened, stubby wing surfaces.

With development of the P-80 jet-propelled airplane, the AAF has hurdled the 500-mile an hour barrier where efficiency of present conventional engine-propeller combinations had begun to restriet airplane perfomanee. Now we are at the bottom rung of a new seetion of a ladder that starts at 30,000 feet and 500 miles an hour.

Practical applieation of the gas turbine—one of the first engines invented by man—to the airplane is a produet of World War II's raee for higher performance aircraft. Although much remains to be learned about the capabilities of turbine-powered aircraft under all taetieal operating conditions, tests to date are more than satisfying.

The AAF's P-80 and P-59 are propellerless aireraft driven by a gas turbine that ejects a gas blast rearward; this reaction gives the forward thrust. Another adaptation of the gas turbine to aircraft, previously mentioned, operates on the same meehanieal drive principle as the water wheel, turning a shaft that is geared to a conventional propeller.

Although aircraft powered by turbine-driven propellers will cruise at speeds of about 300 mph more economically than turbo jet (gas blast) aireraft and will have shorter take-off runs, they will not be able to attain the very high speeds of turbo jet types.

Jet-propelled planes of the future will require thinner and new high speed wings to reduce the high drag that develops due to the compressibility shock waves eneountered at near-sonie and supersonie speeds. They will also have to be aerodynamically elean—no exposed rivet heads, no external projections sueh as antennae and pitot tubes.

Landing gears, if used, probably will continue to be of the trieycle type with a steerable nose wheel; otherwise, steering sueh planes on the ground, in the absence of a propeller blast on the rudder, would be extremely difficult.

Since jet engines are not neeessarily located in the nose, some methods of maintaining balanee of single-engine aireraft usually is required. This is obtained at present by moving the pilot and some equipment farther forward, which provides better vision, and by concentrating the armament in the nose, which reduces gunfire dispersion.

Lack of vibration in jet planes is expected materially to reduce maintenance problems.

Although the turbo-jet engine installation is lighter than that of a eonventional powerplant, this weight advantage is partially offset by the requirement for additional fuel. At high speed the jet plane operates at optimum fuel eonsumption in contrast with eonventional fighters whose best fuel economy is seeured at reduced power and speed.

With development of very-high speed jet planes with small wings, rocket-assist take-off deviees may be used to get them into the air within the limits of present runway lengths. Jet propulsion also ean be adopted as an auxiliary power boost during combat.

Further applieation of the jet propulsion principle is evident in the development of speeialized aerial weapons. The Nazi's V-1 bomb illustrates one type of sueh craft. While long-range researeh explores the potentialities of future aerial weapons, the immediate requirements of eombat will eontinue to influenee aircraft development until the war is won. ☆

(Continued from Page 8)

but because it reveals that the bomb run has begun. Besides, it decreases the airplane's speed and maneuverability. To speed up the action of the bomb bay doors the operation was changed from electric to pneumatic.

Similarly, the landing gear in the early model was operated on two electric circuits. One of these was for normal operation and the other for emergency. It was quickly decided that if the electric system failed even the emergency landing gear would not work. A change was made to a mechanical system which is operated by hand.

None of the above changes would have been accomplished in so short a time if the combat crews had not been superbly trained in the ground work and maintenance required for their plane. They were the only ones left to train, for the ground men left early due to the long sea voyage to India. At the time of their departure, there were not enough Superforts available for the ground crews to gain much practical experience on them. The combat crews were given all of the training in maintenance that the ground echelon ordinarily would have received. This was essential for they would be landing overseas on bases where no one would be familiar with this new type plane. It was originally thought that certain planes might be stationed at far-flung bases to operate as independent units with the combat crew aiding in the heavy ground work.

At all of the groups of the 20th Bomber Command, in the first few months after their arrival, it was no uncommon sight to see the flyers, including pilots, navigators and bombardiers, hard at work until 0300 hours, servicing and maintaining their own craft. At the same time they instructed the ground men, who by virtue of being highly trained in other airplanes, quickly picked it up and took over. For a long while the combat crew of one B-29 held the record for making the fastest engine change. And up in China where there was a shortage of ground personnel due to the many scattered bases, the combat crews pitched in and worked all of the time.

This practical knowledge paid off on many missions. On one strike against Palembang, Sumatra, over 3,600 miles round trip, Maj. Ira Mathews and his crew went over the target on three engines. They lost another on the way back. The men jettisoned everything movable, including their parachutes, to maintain altitude. When they had thrown over everything that was loose they turned to the rest of the craft. Their knowledge of the plane was so good that by the time they arrived at base, the B-29 was stripped of gun turrets and everything else that would unbolt and unscrew. The crew chief refused to believe that it was possible to do such a job while flying. However, the ground boys felt some small compensation, for it simplified their work of converting the almost naked plane into a tanker to fly the Hump.

Originally, it was thought that a good deal of work would have to be done by the service squadrons and depot groups because of the size of the plane. But the ground crews took over so well that it only necessitated additional equipment such as 'crows' nests to work on rudders and stabilizers, before they were doing as much on the Superforts as they used to do on the B-24s and B-17s. The maintenance equipment of the ground crews was immediately supplemented 100 percent.

No engine on any aircraft in the world gets the attention that the Wright does on the B-29. By now, the ground crews and engineering officers know where the trouble is before it occurs and like the fabulous doctors of fiction and screen—but not of real life—they can diagnose weaknesses before they begin and correct them with unfailing accuracy and professional aplomb.

Cylinder compression checks are made generally every 50 hours. Valve adjustment is critical. In some groups the engineering officer has this checked after every mission. Valve guides are inspected every ten hours after the first 100 hours. And before installation, no matter in what condition it is supposedly in, every new engine has the valve clearances measured thoroughly.

Although the life between engine overhaul was supposed to be 400 hours—doubtless it soon will be—the average engine time of the B-29 in combat is 152 hours. Then the engine is pulled and sent back for rebuilding. Engine changes occupy the maintenance crews day and night. Under the best conditions, with the accessories already in place and everything built up, it takes two crews about 24 hours to install a new engine.

Superficially all of this may appear to be a list of troubles. It most decidedly is not. It is merely the story of the most rapid transition of any new plane from what was practically an experimental or "X" model to the accepted or "B" phase of a bomber in operation. And an example of the excellence of the theoretical side of engineering is the amazing gunnery system that has exceeded all claims. On a solo photo mission a Superfort piloted by Maj. (then captain) John C. Eigenmann was jumped by more than 90 fighters over Japan. In a running hour-long battle, these men of the 20th Bomber Command shot down seven enemy fighters and got two probables, and landed at its base without sustaining even minor scratches—emphatic tribute to central fire control.

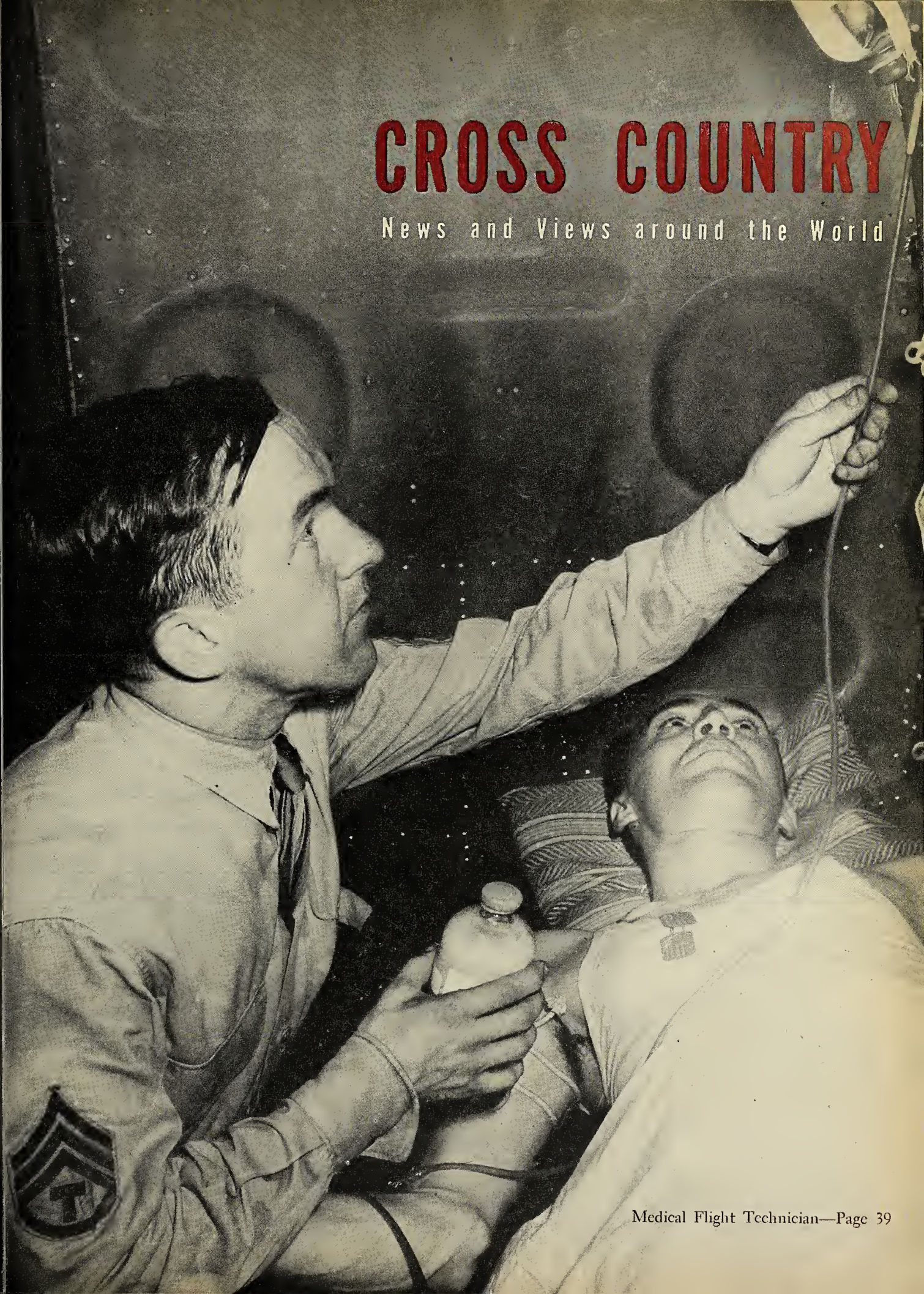
To know how good the Superfortress really is you have only to ask the men of the 20th Bomber Command who have done most of this pioneering work the hard way. They will probably tell you to keep watching the newspapers to see what they and the 21st Bomber Command are doing. Or they might mention Capt. Charles Joyce who brought his B-29 in to a perfect dead stick landing on his home field when he ran out of gas at 10,000 feet after a mission. But in all probability, they will just refer you to the Japs. The Japs know more about the rapid improvement of the B-29 than anybody else. ☆

THE FLYING WHALES

Here are new creatures for your bestiary:
These strange steel fish that swarm the seas of space
In strict protective shoal, slow-witted, wary
Behemoths moving with a monster grace.
Clouds are their coral and the land that lies
Five thousand fathoms down and drowned in mist
Is but the lost Atlantis of the skies,
A poisoned plain of pearl and amethyst.

Their giant hearts will not survive a spring
Too temperate for such primeval rage.
Yet men of some millennium may sing
Of golden legends in an armored age
And chronicle, when cataclysms cease,
These prehistoric harbingers of peace.

—Capt. David F. Parry, AAF


CROSS COUNTRY
News and Views around the World

Balkan Rescues

Word comes from MAAF that their Air Crew Rescue Unit, set up last July by Lt. Gen. Ira C. Eaker for the purpose of saving Allied aircrews shot down in the Balkans and central Europe, really has been going great guns. From July to December, 1944, the ACRU rescued a total of 3,200 men from Romania, Bulgaria, Greece, Albania, northern Italy and Czechoslovakia.

Back from the Balkans in blankets

The ACRU is headed by a 53-year old pilot who was a member of the Yugoslav Air Force during the first world war and who has a thorough knowledge of the Balkans and the people who are hiding and caring for the hundreds of Allied airmen who have parachuted from flak-riddled planes or crash-landed on meadows and wheat fields. To locate these men, collect them at pre-determined landing areas, and build strips on which the rescue planes could land, "field teams" were organized and dropped by parachute. Many times these field teams had to fight their way out of traps the Nazis set for them. Members of the underground, Partisans, and people of the villages fed the team members, housed them, helped them build the necessary landing strips.

When rescue missions have to be delayed, ACRU sustains the evacuees by dropping food, clothing, and medical supplies to them, and, when possible, cigarettes, insect powder, candy, radios, and even anti-tank guns are parachuted. Long underwear drawers are loaded with sugar in one leg, salt in the other, and dropped, but sometimes the sugar and salt get mixed up en-route.

Although the ACRU staff consists only of one lieutenant and a staff sergeant for administrative work, two pilots, one navigator, two radio operators, and two plane engineers, other air force people are called in for assistance when needed. Fighter escorts are borrowed regularly from the 15th Air Force, troop carriers from the Balkan Air Force, language experts from other outfits. For example, 1st Lt. Nickolas A. Lalich was borrowed from another outfit because he spoke Serbian, Croatian, and Slovenian, and there was a particular job to do that required knowledge of these languages. Lieutenant Lalich was dropped into Yugoslav territory on a mission that was to take three days. He stayed four months. He lived and worked with Gen. Draja Mihailovich and succeeded in arranging four day and four night evacuations. Although he had to travel all the way across Serbia and Bosnia to do it, he accounted for the evacuation of 426 men.

Similar arrangements have been made with Marshal Tito and his Partisans, and it appears that political and factional differences have not affected the evacuations. When the Germans made their big bid last May to capture Tito and wipe out his Partisan army, members of the ACRU were in his headquarters making evacuation arrangements. The Air Crew Rescue men escaped from the Nazi paratroopers, found a British "puddle jumper" on a little airstrip, and got back to their base in Italy. The information they brought back set the pattern for the subsequent attacks by the 15th Air Force which helped Tito out of this critical situation.

Although the ACRU's main task is to bring back American crewmen, they also have rescued Englishmen, New Zealanders, South Africans, Frenchmen, Poles, Czechs, Yugoslavs, Russians and Italians. Naturally, the rescued men are always jubilant over their good luck and they bring back with them fur hats and bright-colored blankets and ceremonial aprons and odd-shaped jugs of wine. When they rescue planes are about to take off, many of them toss their shoes to the people who have hidden them and cared for them. It's the most concrete expression of gratitude they can think of.

Variety of Combat

A B-17 made an emergency landing in German minefields right in the middle of a battle. Most of the crew members froze where they were until American sappers escorted them back to comparatively safe ground. Then for two days the Fortress crew learned the delights of ground combat —they were strafed by FW-190s while a Nazi railway gun blasted at the building in which they were billeted. Returned to their base, all members of this crew are frequently to be heard singing "The Air Corps Song" with great gusto.

Then they took a powder

Sawmill

In the past year, each week has seen a fatal or near-fatal accident in the Continental United States, caused by personnel walking into turning propellers. Of the 53 accidents tabulated in a recent report by the Office of Flying Safety, 34 were fatal, 17 resulted in major injury and only two

allowed the prop-walkers to get away with minor injuries.

Although in most cases the victims actually walked into the propellers from fore or aft, one case is reported of a crew chief who, instead of using a service ladder, descended from the wing of a B-25 by sliding down a propeller blade. The engine was hot, fired, and the propellers turned, killing the man.

In another case, the bombardier of a B-24 attempted to sidle between the fuselage and the propeller while carrying camera equipment. He was struck by No. 3 propeller and killed instantly.

P-51 Rumble Seat

Probably the first case of hitch-hiking in a P-51 occurred during the early stages of the Allied drive across Normandy.

Returning from a sweep over the French hedgerows, Lt. Col. Bert Marshall, CO of the 355th Fighter Group, was forced down on a rolling potato field. As excited peasants began to swarm the plane, another P-51 pilot, Lieutenant Perry, came over and decided to risk a rescue. After making a successful landing and finding Colonel Marshall unhurt but a little chagrined, 6' 4" Lieutenant Perry, sitting on the lap of his CO, effected a successful but bumpy take-off.

Medical Flight Technicians

He wears aircrew wings, yet he has never been on a combat mission against the enemy. He is subject to air attack, but he cannot fight back. Some months he logs more flying time than many pilots. The cargo entrusted to his care carries the highest available priority. He is an enlisted man whose immediate superior is a woman. He is a medical flight technician assigned to Air Evacuation, either in the Air Transport or Troop Carrier commands.

Air Evacuation planes come right into the battle zones, collect casualties, and fly them to base hospitals and later to hospitals in the States. They also move patients between hospitals. Ordinarily, in each aircraft a flight nurse and a medical flight technician team up to attend the patients. But with the increased number of wounded, and the shortage of nurses, the tech often has been separated from his teammate and assigned to a plane to handle the job alone. The low fatality rate of patients evacuated by air—5 per 100,000 flights—attests to his ability.

A medical tech is a doctor, nurse, orderly, and morale builder combined. He feeds the wounded, changes dressings, gives plasma, administers drugs, manipulates bed pans, takes temperatures and gives advice to the sick and injured who need sympathetic attention as well as medical care. The abilities required of him are among the most unusual in the AAF, for he must be able to provide medical attention, play checkers and cards, and be acquainted with the latest Stateside gossip. And there are times when an enlisted man must inform the pilot of necessary changes in the flight schedule.

QUESTIONS
on Policy and Procedure

Q. May a husband and wife use their combined rights under the "GI Bill of Rights" in obtaining a guaranty of a loan from the Veterans Administration?

A. *Yes. Ex-Marine Pfc. Herbert J. Pugh and his wife, ex-Marine Cpl. Florence S. Pugh, were the first to use their combined rights. They purchased a house for $8,000, and the Veterans Administration guaranteed $2,000 for each of the veterans, making a total guaranty of $4,000, which is the maximum of 50 percent permitted under the law.*

Q. Are War Department Technical Manuals directive in nature?

A. *The Adjutant General advises that "Technical Manuals are normally issued 'for information and guidance.' As such, they are not directives in themselves, but present a correct procedure which should be followed except where unusual circumstances make deviations advisable. In some instances directives have been issued requiring compliance with some or all the provisions of a particular manual, such as AR 345-125 (18 Nov 1944) which directs that Service Records be maintained in accordance with TM 12-230."*

Q. May the oversea service bar be worn on the summer shirt?

A. *Yes. Sec. II, Cir. 268, WD, 1944, states that the oversea service bar will be worn on the service coat (or the jacket, field, wool, where issued in lieu of the service coat) and on shirts, winter and summer. (Note: Some personnel have been noted with oversea bars on their overcoats. There is no authority for such wearing of the bars.)*

Q. Is the family allowance made to the dependents of enlisted men exempt from Federal income tax?

A. *The entire amount of the family allowance is exempt from tax on the part of the beneficiary. The portion contributed by the Government is considered to be a gift, but the amount withheld from the pay of the enlisted man is part of his taxable income.*

Q. Can school and college credit be obtained for military training, service experience, and off-duty training?

A. *Yes. However, personnel on active duty should apply for school or college credit only for the purposes of meeting requirements for admission to courses, schools, or other educational institutions; qualifying for higher military ratings; planning their further military or civilian education. Evaluation of educational achievement should be requested by use of U. S. Armed Forces Institute Form 47 (revised September 1944), subject, "Application for Credit for Educational Achievement During Military Service." When properly filled out it should be mailed to the civilian school or college, not to USAFI. Additional information is contained in AAF Ltrs 34-14 and 34-9.*

Q. What is the authorized shade of battle jackets for officers?

A. *After present stocks of the dark shade battle jackets are exhausted, all officers purchasing this item are required to confine themselves to the purchase of regulation jacket, wool, serge, shade 33 (same as for enlisted men). Sec. IV, Cir 1, WD, 1945, indicates that this policy will permit conservation of clastique, barathea and whipcord, o.d. shade 51 (dark shade). Officers who have purchased the dark shade battle jackets are permitted to wear them until they are worn out. The battle jacket is an optional item for officers within the United States.*

Q. Is it necessary to forward Service Records by registered mail?

A. *No. In order to conserve manpower incident to processing registered mail, the practice of forwarding Service Records and other routine matter by such means will be discontinued and ordinary mail facilities will be utilized. (Sec VI, Cir 32, WD, 1945).*

Q. Where is the authority for an individual to wear oversea service bars recorded?

A. *Under "Remarks—Administrative" in the Service Record of enlisted personnel, and on Officer's and Warrant Officer's Qualification Cards (WD AGO Form 66-1 or 66-2, as the case may be) for officers and warrant officers. (Par. 6, Cir 268, WD, 1944).*

Q. When are bank statements obtained and made part of the voucher file for unit and similar funds?

A. *At the end of each month, upon change of custodians, upon change of station, and when the account is closed out.*

PREPARED BY THE OFFICE OF THE AIR INSPECTOR

Out of the hat

It is dangerous to fly too high when carrying patients who suffer from certain wounds. Head injuries, neuro-psychiatric cases, abdominal wounds, and lung injuries may be adversely affected by high altitude flying. On one mission from Bermuda to Miami, the medical tech discovered that one of his patients was having breathing difficulties. A quick check of the patient's card revealed that he was suffering from a lung ailment. The tech requested the pilot to bring the plane down low over the water. They flew the rest of the way between 100 and 600 feet and the patient arrived in Miami safely.

Evacuation planes are not marked with the Red Cross insignia because they fly war cargo into the battle zones. Consequently, they are fair game to the enemy at all times, and often have fighter escort during part of their flight. Several techs have been killed when their unarmed planes were attacked.

Surgical technicians are trained at the School of Aviation Medicine, Randolph Field, Texas. To be eligible, they must be graduates of a recognized Army medical or surgical school and must—because of the danger and hardships involved—be volunteers. They take the same courses required of flight nurses and are put through rigid basic training, drill, bivouacs, and mock warfare, in addition to classes in air evacuation.

They rank as technicians third grade, and are equivalent in grade to staff sergeants. Their base pay of $96 is augmented by an additional $60 per month flying pay, 20 percent for foreign service, and in the U. S. a travel expense allowance for air time. They are another example of the important, dangerous, exacting, unsung work being done by AAF personnel all over the world.

Rotation Policy

One service squadron of the 13th Air Force has been overseas 29 months, enjoying the character-building attributes of jungle life, being shelled, strafed and bombed. Recently they received a quota enabling seven of them to return to the States for furlough reassignment. They drew straws for the chance, although the poker players among them had other ideas.

Obituary

In the February issue of AIR FORCE appeared an article called "Shock Waves at 600 MPH." It described Wright Field's recent experiments in compressibility at high speeds and reported the achievements of Maj. Frederic A. Borsodi, who, while diving a P-51D from 40,000 feet, was the first man ever to see a compressibility shock wave on an aircraft wing—and who later installed a camera in his plane and became the first man to photograph such a phenomenon.

Major Borsodi

On January 31, 1945, Major Borsodi was killed while testing a combat plane in England. He was 28 years old, and, at his death, was Chief of the Fighter Branch, Flight Section, Air Technical Service Command, Wright Field. Formerly employed as a test pilot by the Pratt & Whitney Division of the United Aircraft Corporation, Major Borsodi entered the service August, 1942. He served for a year in North Africa, making 130 missions as a fighter pilot, before being assigned to Wright Field.

Drama

Arriving at an 8th Air Force Bomber Station to visit his son, whom he hadn't seen for two years, Col. Samuel Greason was one of the first to learn that the B-17 piloted by his son was the only one of the 457th Group's formation that failed to return from the 1,000-bomber assault on Berlin, February 3.

Colonel Greason, an officer on General Eisenhower's staff, was in the control tower when the group's Fortresses returned. One by one the bombers were accounted for and the name of the pilots checked off until only one remained—2nd Lt. Craig P. Greason.

Visibly affected, Colonel Greason nevertheless accepted the disheartening news stoically, buoyed up by veteran combat men's assurances that his son might have made an emergency landing at another base.

The following morning he was attending services in the base chapel when he was notified that his son was safe, having landed a damaged Fortress safely in friendly territory on the continent. Several hours later, the entire crew was brought back to their station in an Army transport plane, and Colonel Greason was the first to greet his son.

Big Toe Bombsight

When the CO of a 9th Air Force B-26 group put out a call for enlisted men to act as bomb-togglers, T/Sgt. Miller C. Petersen volunteered. He flew his first mission on D-day for Normandy and became very proficient at releasing his bombs when he saw the lead plane of his formation drop its load. But one day he was riding in the nose of a B-26 called "Booger Red," piloted by 1st Lt. John Sivert, and they had a lot of engine trouble. Unable to keep up with the formation they fell behind but continued to the target, even though they were too short of power to take evasive action. As a result flak got one engine before they went into their bomb run.

When they came over the target after the rest of the formation had bombed, Petersen saw that the bridge they were to destroy was still standing. With no bombsight he took a deep sigh, guessed, and toggled.

Precision guessing

He hit the bridge and destroyed it, navigated the wounded Marauder back to base, and accepted the DFC. Only one thing bothers him—people accuse him of bombing off his big toe. "It was precision," he says. "Precision bombing."

Survivor

Behind the injuries which cut short the combat career of S/Sgt. Frederick O. Walsh, engineer and top-turret gunner, is one of the most dramatic escapes from death ever experienced by an 8th Air Force airman. Walsh, formerly an aircraft mechanic and instructor at Brookley Field in Mobile, was one of four men who escaped when two bombers collided in mid-air near

London, taking 14 flyers to their death.

"I was checking my gun turret as our formation swung in a wide arc across the sky near London and headed for the continent," Walsh explained. "Our bomb bay was filled with heavy explosives for a German target. Suddenly I glanced up. Another bomber was slipping wildly down on us. There was only time to shout a warning into the interphone before the other plane pancaked onto us with a grinding roar. Almost immediately, there was a sharp explosion and I lost consciousness.

"When I came to, I was lying at the base of my turret," he went on. "The whole cockpit was ablaze. I could see the skipper and copilot slumped in their seats, their bodies burned almost black. I thought of getting out, but at once discovered that my chute was gone.

"It was a terrible realization. I glanced at the escape door, leading into the bomb bay, and found myself looking into the sky. The plane had been blown in half by the explosion and the wind was whistling through the opening.

"Then I saw my parachute dangling in space and held only by part of the harness which caught on a jagged edge of metal a few feet from me.

"I was almost afraid to reach for it, for fear it might slip out of my grasp. Finally I grabbed it and slipped it on. The whole cockpit was flaming as I stepped out the escape door. My chute opened when I was only a few feet above tree-tops and I landed on the ground with a rough jolt, too stunned and exhausted to move. Villagers from a nearby English town gathered around me and helped me up."

Handy Heater

Sometimes the nights are chill in the Mediterranean area, and that's when Pvt. Charles Stafford is in greatest demand. A tractor operator at a chemical depot of the 15th Air Force Service Command, Private Stafford is also an accomplished fire eater. He's an ex-circus performer but now his shows are mainly for the benefit of his buddies whom he entertains at the drop of a match.

Deicer de luxe

PLANE BONERS

Analyzed by Veteran Pilots

WILL ROGERS FIELD, OKLA.—The pilot of a P-38F had started his take-off run. Upon reaching the first intersection, the tail booms began dragging, indicating that the landing gear had started to retract. About 1,000 feet further along, the props began digging in the runway. The airplane was seen to leave the runway, gain an altitude of about 20 feet. Then the left wing dropped, the nose of the plane struck the ground and the plane cartwheeled 180 degrees to the left.

Comment: This eager pilot was obviously ready to leave the ground before his airplane. Before you start retracting your gear, it's a good idea to be sure that your airplane is airborne.

SIOUX CITY, IOWA—The copilot of a B-17F made a landing and, at the end of the landing roll, requested that the tailwheel be unlocked. After doing this the pilot—acting as copilot—mistook the landing gear switch for the flap switch and retracted the landing gear.

Comment: This is the type of man who may some day release his bombs without opening the bomb bay doors.

DOVER, DEL.—After landing, the pilot of a P-47D taxied along behind a FOLLOW ME truck to the parking area. The driver of the truck drove through a space between an oil truck and another airplane. The space was not wide enough for the P-47 to follow with safety, and when the pilot saw that he was about to hit the oil truck, he applied his brakes and nosed over.

Comment: A FOLLOW ME truck should not be followed just because the words are nicely painted on the back. If you don't think you have adequate room in which to taxi, you should stop your airplane long before danger of collision becomes imminent, and demand a safer path.

ABILENE, TEXAS—As he approached his home town, the leader of a two-plane flight of P-47Ds started a gradual dive. When he was down to 500 feet, his wingman decided to pull up. The leader joined him, but again flew low over the town while his wingman stayed at 2,500 feet. The next thing seen by the wingman was a puff of smoke north of the town which his leader was buzzing. According to a witness, the pilot of the lead plane executed a slow roll on his last pass over the town at about 200 feet. He started into another, lost altitude, and crashed into a pasture. The airplane was a total wreck and the pilot was killed.

Comment: The pay-off for the grandstand pilot who violates regulations against low flying is always a severe fine and sometimes more. In this case the pay-off was an untimely death. The pilot had also chalked up another strike against himself by violating TO 01-65b-87 which prohibits slow rolls in P-47s equipped with bubble canopies.

PUEBLO, COLO.—While awaiting the signal from the tower for the take-off, the pilot of a B-24J noticed smoke in the cockpit. He informed the tower, and fire equipment was immediately dispatched to the plane. Approaching the airplane on the fire truck, a civilian fireman jumped off, pulling the hose with him, and headed for the propeller near the front bomb bay section. He walked straight into No. 3 propeller and was instantly killed.

Comment: This is another of those tragedies which result from thoughtlessly approaching turning props, but in this case the pilot's failure to stop all engines upon the arrival of emergency equipment is partly to blame.

TONAPAH, NEV.—On the cease firing order of an instructor pilot, the pilot of a B-24J pulled up to go around during a gunnery mission. The armorer who was feeding the ammunition belt into the left waist gun lost his balance as the airplane pulled up and bumped the left waist gunner. This gunner grabbed at the gun for support and in doing so fired two bursts which plugged 15 holes into the left wing and disconnected the aileron.

Comment: If the left waist gunner had been wearing his safety belt, he would not have had to grab at his gun, or anything else, for support. Safety belts are common sense.

PIERRE, S. D.—Because of a rough engine, the pilot of a P-40N decided to return to the line where he attempted to clear the engine by running it up. He used excessive power in the runup, and while checking instruments failed to observe the position of the airplane in the relation to the ground. He nosed over.

Comment: The action of this pilot in returning to the line was commendable but he spoiled it all by allowing himself to become so engrossed in clearing up the trouble, that he overlooked the simple precaution of holding his stick back during the runup.

PREPARED BY THE OFFICE OF FLYING SAFETY.

NEW BOOKS
On Aviation Subjects

AT WAR

HELLDIVER SQUADRON. *Robert Olds.* Story of Carrier Bombing Squadron 17 in the Pacific. N. Y., DODD, MEAD, 1944.

NO TUMULT, NO SHOUTING: THE STORY OF THE PBY. *Lois* and *Don Thorburn.* An account of the people who make and fly Catalina patrol bombers. N. Y., HOLT, 1945.

THE STORY OF THE U. S. ARMY AIR FORCES. *Jim Ray.* Men and machines that make up the aerial fighting force of the U. S. Army. GARDEN CITY, N. Y., GARDEN CITY PUBLISHING CO., 1945.

POSTWAR

THE VETERAN COMES BACK. *Williard Waller.* A comprehensive discussion of the returning veteran's problems. N. Y., DRYDEN PRESS, 1944.

TECHNICAL

AIRCRAFT ARMAMENT. *Louis Bruchiss.* The history and development of aerial firepower. N. Y., AEROSPHERE, 1945.

AIRCRAFT MECHANICAL DRAWING. *D. J. Davis* and *C. H. Goen.* The essential principles and skills required for a knowledge of practical aircraft drafting. N. Y., MC GRAW-HILL, 1944.

INTERMEDIATE AERODYNAMICS. *R. W. Truitt.* Facts and theories for aerodynamic applications with descriptive material and mathematical explanations. N. Y., PITMAN, 1944.

MANUAL OF PHOTOGRAMMETRY. *American Society of Photogrammetry.* A thorough treatise dealing with all aspects of the subject. N. Y., PITMAN, 1944.

ROCKETS, DYNAMOTORS, JET MOTORS. *A. L. Murphy.* Questions and answers on the rocket and jet propulsion principles in motors. LOS ANGELES, WETZEL PUBLISHING CO., 1944.

YEARBOOKS AND HANDBOOKS

ENGLISH-SPANISH AND SPANISH-ENGLISH DICTIONARY OF AVIATION TERMS. *Juan Klein Serralles.* Dictionary key to the aviation terminology of Latin America. N. Y., MC GRAW-HILL, 1944.

THE LANGUAGE OF WORLD WAR II. *A. M. Taylor.* Abbreviations, captions, quotations, slogans, titles, other terms and phrases. N. Y., H. W. WILSON, 1944.

THE SOLDIER AND HIS FAMILY; FEDERAL BENEFITS AND HOW TO GET THEM. A comprehensive compilation based on official sources. HARRISBURG, PA., MILITARY SERVICE PUBLISHING CO., 1944.

SURVIVAL: LAND, SEA, JUNGLE, ARCTIC. *Airlines War Training Institute.* A manual for aircraft crews and others forced down, adrift, or getting back to help in all parts of the world. WASHINGTON, INFANTRY JOURNAL, 1944.

These books are available to AAF personnel through the AAF Field Technical Library Service, which provides for technical libraries at all major installations. For personal copies contact the publishers or retail bookstores. List compiled by AAF Headquarters Library.

Command Changes

Recent changes in AAF command and assignments:

Maj. Gen.[6] Hubert R. Harmon, from Commander, Personnel Distribution Command, to Assistant Chief of Air Staff, Personnel.

Brig. Gen. Frederic H. Smith, Jr., from Deputy Chief of Air Staff, to commander, 5th Fighter Command.

Brig. Gen. Reuben C. Hood, Jr., from Deputy Chief of Staff for Operations and Training, Continental Air Forces, to Deputy Chief of Air Staff.

Arctic Rescue

An ATC C-47 crashed amid the glaciers of the Alaska range of mountains. 11th Air Force and ATC planes spotted the wreckage, lying near the top of a nameless peak of the McKinley Group—in the middle of an area marked on the map as "Unsurveyed."

The condition of the wreckage made it clear that the 19 men aboard the plane—crew of three plus 16 men who were returning to the United States on furlough—could not possibly have lived, but it was decided to send an expedition to the scene of the disaster for the purpose of evolving a technique of land rescue in "impossible terrain," to recover the bodies, and to determine the cause of the crash.

A 44-man party led by Grant Pearson, veteran mountain climber and Chief Ranger of McKinley Park, set out to make the attempt in mid-winter. With equipment valued at nearly a million dollars they successfully reached the wreckage and returned to base without a casualty. Food and supplies were dropped to them by Troop Carrier aircraft, communications maintained by radio.

Alaskans count it the most hazardous such expedition ever attempted, and certainly the largest and most elaborate. From it a plan of procedure that will be used in future land rescue work has been evolved.

Start of the long pull

Free Entry

Ingenious ASC soldiers in ETO solved their Christmas shopping problems and beat Parisian prices at the same time.

From an abandoned Jerry warehouse, they gathered 1,000 pairs of real wooden shoes, branded "Paris, 1944" on the toes and then coated each shoe with a high glaze.

"I wouldn't be surprised if the girls back home wore 'em," commented one GI. "They wore 'wedgies' didn't they?"

Getting Well with Music

The tinkling strains of many an old familiar song now are heard in AAF hospitals as the latest wrinkle in convalescent training comes into use. A poster series and an Air Forces Manual combine to invoke

the possibilities of music as an immensely successful healer for both body and mind.

The poster series, "Make and Play Your Own Musical Instrument," first of all shows the patient how to make a "Xylette," or miniature piano, in a hospital workshop. Once the piano is constructed, the patient takes up AF Manual No. 29 (Book I), called "Sit Down and Play," and learns how to play the instrument by a simple, direct piano-course method.

Both the construction of the piano and the music practice relieve the problems of too little exercise and too much boredom usually confronting the patient. He has the thrill of building a workable device and then learning to utilize it. Especially is the process valuable in the case of injured hand and arm muscles.

Both poster series and manual, copyrighted by Harold B. Rhodes, formerly of the Air Forces, have been published by the Training Aids Division, Office of Assistant Chief of Air Staff, Training. Copies of both may be procured through channels from the Office of the Air Surgeon.

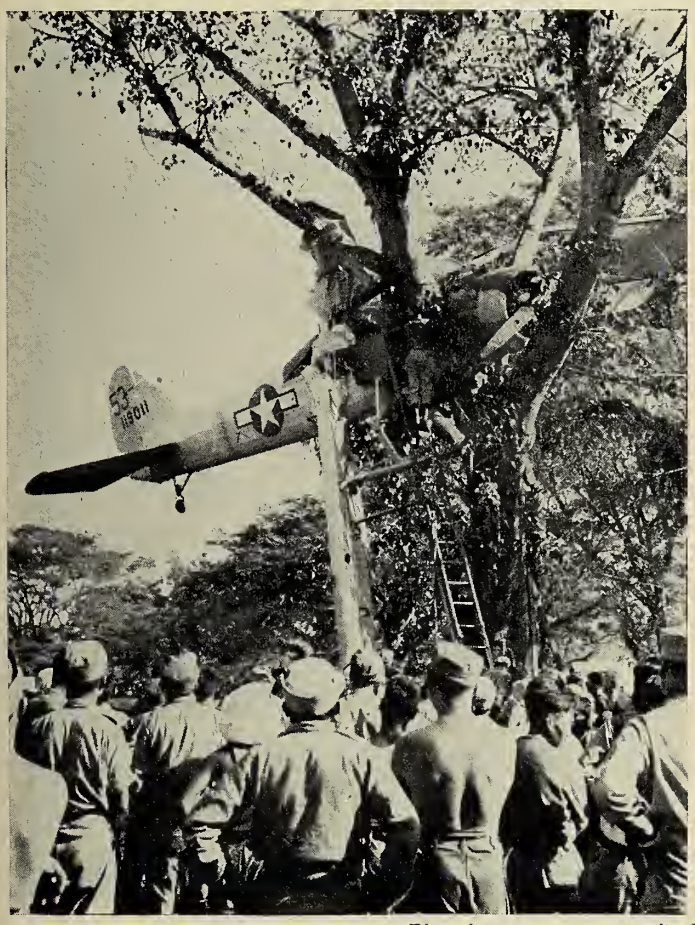
Wedding

At 9th Air Force Headquarters in France, romance is rampant. Recently there was a double all-GI wedding with Sgt. Francis P. Flynn marrying Wac Cpl. Alma C. Winn. As soon as the Flynns were Flynns they acted as attendants for the marriage of Sgt. George Morris and Wac Pfc. Emma Lou Smythe.

Crash in Burma

Sometimes liaison pilots are not so lucky. Taking off from short runways with heavy loads, they run into trouble. A couple of photographs so dramatic that they look like movie stills came into this office recently. They show what happened when a liaison plane piloted by Sgt. W. H. Latta of Rochester, N. Y., crashed into a tree. Latta suffered a fractured leg and lacerations of the face.

His passengers, three wounded infantrymen of the Mars Task Force being evacuated from the jungle battlefield, were rescued with ladders, ropes, and pulleys, and treated for additional shock.



The plane was out on a limb—but the pilot came out alive

Battle Honors

Ten more AAF units have been awarded Distinguished Unit Citations since the listing (complete to Jan. 1, 1945) published in the March issue of AIR FORCE. They are presented below in the chronological sequence of the actions for which they were cited, together with a digest of the citation as printed in General Orders of the War Department.

47th Bombardment Group (L) Feb. 22, '43

Profoundly influenced the course of the war in the North African Theater after the German breakthrough at Kasserine Pass. On February 21, when the enemy breakthrough threatened to become an Allied disaster, our air forces received urgent orders to give all possible cooperation in stopping their advance. In the 11 missions flown on the next day, the 47th Bombardment Group attacked the advancing enemy armor with such devastating effect that before nightfall they had been driven back in full retreat.

95th Bombardment Group (H) Mar. 4, '44

Brought to a successful conclusion our country's first daylight combat operation over the capital of Germany, despite treacherous cloud conditions and inadequate fighter escort. Though the energies of the entire 8th Air Force were devoted to this vital operation, only the 95th Bombardment Group (plus 12 planes of another group) got through to the primary target of Berlin to bomb it for the first time by daylight.

May 6-20, '44

10th Photographic Group (Reconnaissance)

Executed missions of highest priority in photographing the beaches of the continent prior to the assault by our ground forces on D-day. In order to obtain oblique photos of the requisite clarity and detail, the pilots of this group flew their unarmed P-38s as low as 25 feet in the face of fire from some of the strongest antiaircraft installations in western Europe. By the successful

TRAINING AIDS

Newly Standardized for Field Use

FILMS

TF 1-3457, AAF Instructional Methods As Demonstrated in a Flexible Gunnery School—Expounds proper teaching methods, shows common teaching mistakes. Principles apply equally well to instructors in any field, although specific examples are drawn from flexible gunnery classrooms and firing range. Running time: 21 minutes.

TF 1-3458, Making a Gunner—Story of typical gunner, showing how he is trained and stressing importance of his part in a combat bomber team. Designed to orient prospective gunners. Running time: 18 minutes.

TF 1-3452, Operation of the K-10 and K-11 Compensating Gun Sights—Using animated character "Trigger Joe," explains simplified theory on which K-10 and K-11 sights work, plus easily understood physical breakdown of their working parts. Running time: 10 minutes.

TF 1-3438, Tactical Use of the Glider Pick-Up—Demonstrates principles and methods of tactical use of glider delivery and pick-up by tug-planes. Running time: 12 minutes.

TF 1-3455, Loading the C-47—Shows how to load the C-47 with men and equipment quickly and well, then unload it, ready for action. Running time: 7 minutes.

TF 1-3454, B-17 Troop Carriers—How Fortress, converted, can be used as a troop carrier. Running time: 7 minutes.

TF 1-3668, Assembly and Rigging of the P-63 Airplane. Running time: 25 minutes.

TF 1-3688, Preflight and Daily Inspection of the P-63. Running time: 19 minutes.

FS 1-2094, Improvised Sanitary Devices from AAF Salvage Material—Describes construction, from salvage, of many efficient devices to increase comfort and to protect health of personnel.

PUBLICATIONS

First Aid in Flight (AF Manual No. 45)—Pocket-size booklet briefing life-saving during flight.

Syllabus for Bombing Trainer, Type A-7—General suggestions for instructor and outline of trainer course.

Camouflage Principles—A report of AAF Board concerned with complex theories of camouflage of aircraft in flight.

Radio Operator's Information File—Comprehensive coverage on all procedures and problems of airborne radio operators. Distribution to all airborne radio operators now being made.

Lecture A-III: The Arctic, Survival—Concisely itemized information on Arctic Survival, with drawings.

Appendix to Arctic, Desert, Tropic School Lectures—Separate publication that is a digest of incidents of survival in the Arctic, Desert and Tropics.

(Copies of both lectures above are available from Arctic, Desert and Tropic Branch, AAF Tactical Center, Orlando, Fla.)

Let's Walk (AF Manual No. 49)—Highly important non-technical publication showing directly and simply how maimed soldiers can rebuild lives by rebuilding their bodies and learning valuable techniques of getting around.

DEVICES

Supplement No. 2 to Training Aids Catalog, Part I, Training Devices—Illustrations, descriptions and applicable technical data for 11 newly standardized devices.

GRAPHICS

Ground Safety Posters—Three new posters in the ground safety series, these depicting the misadventures of a cartoon character called "Pvt. Wilbie Hoitz." Distributed on planned basis and additional copies not available.

RECOGNITION

Recognition Films—TF 1-3712, U. S. Navy Aircraft Recognition Test No. 5 (U. S. Army, U. S. Navy, British and Jap Aircraft).

TF 1-3713—U. S. Navy Aircraft Recognition Test No. 7 (Pacific Theater).

TF 1-3714—U. S. Navy Aircraft Recognition Test No. 9 (All Theaters).

TF 1-3715—U. S. Navy Aircraft Recognition Test No. 10 (All Theaters).

Information on the availability of training aids listed in this column, unless otherwise indicated, may be obtained from the chief, Training Aids Division, Army Air Forces, One Park Avenue, New York 16, N. Y., upon request through channels.

accomplishment of the assigned task, the group obtained excellent photos of the enemy's coastal defenses, from which our assault troops were briefed.

352nd Fighter Group (S) May 8, 1944

Broke the enemy's attempt to frustrate a bomber operation against Brunswick, Germany, by engaging a numerically superior force of FW-190s and ME-109s in an hour-long battle. During and after the initial flight to the deck from 20,000 feet, an unprecedented aerial battle took place with pilots of this unit attacking without regard to the position and strength of the opposing forces. The tactical skill and aggressiveness of the 352nd Fighter Group are reflected in the fact that only one pilot and aircraft was lost in this action, to 27 enemy aircraft shot down.

June 6-14, '44

819th Engineer Aviation Battalion (9th AF)

Completed an emergency landing strip by nightfall of D-day in Normandy after advance elements landed at H plus three hours. In the next seven days the members of this battalion advanced inland to construct a refueling and rearming strip that was operational on the date originally scheduled, thereby greatly facilitating aerial operations in northern France during a critical phase of the combat.

June 6-July 16, '44

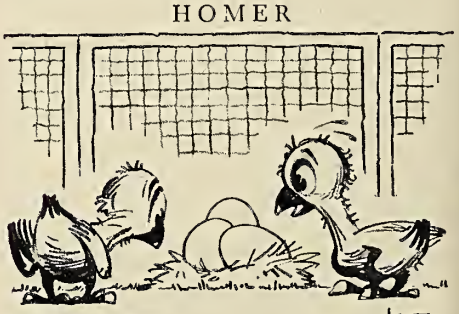
834th Engineer Aviation Battalion (9th AF)

Built an emergency landing strip in 16 hours on a site reconnoitered in the field, when the terrain previously selected for the strip still remained in enemy hands on D plus 1. Within 24 hours the runway had been lengthened to 3,400 feet, permitting its use by transports evacuating the wounded from the Normandy battlefront. Moving up behind the advanced infantry elements, the battalion took over the area originally scheduled and by June 14, converted it into an operational airfield, despite enemy snipers and mines.

376th Bombardment Group (H) June 16, '44

Accurately bombed an oil refinery at Bratislava, Czechoslovakia, despite persistent enemy opposition lasting for more than half an hour. Bombs were concentrated in the target area, inflicting grave damage to vital installations and supplies.

HOMER



AIR FORCE MAGAZINE

"I see the old man's had his TO increased again. Now maybe we can get a rating."

455th Bombardment Group (H) June 26, '44

Inflicted heavy damage on an oil refinery at Moosbierbaum, Austria, after surviving attacks by nearly 150 enemy fighters enroute to the target. The spirit of the attack was typified by two bombers set aflame by enemy fire, which nevertheless completed the bombing run and then exploded in mid-air. The gunners of the group are credited with destroying 34 enemy aircraft. Ten bombers of the group did not return.

Sept. 23, '44

340th Bombardment Group (M)

Demonstrated unsurpassed teamwork of maintenance, operations, intelligence and flying personnel in executing an attack by B-25s on the Italian light cruiser Taranto which the enemy planned to scuttle in the mouth of La Spezia Harbor. Despite intense antiaircraft fire, the first three flights covered the bow, beam and stern of the ship with so many hits that it capsized before the final flight could release its bombs. This culminated a long and unbroken series of flawlessly executed attacks by this group on pinpoint and area targets.

Dec. 23-26,'44

391st Bombardment Group (M)

Contributed vital assistance to the ground forces at a most critical time by bombing railway viaducts, bridges and other communication targets in Germany behind the Ardennes battleground. These included the railroad viaduct at Ahrweiler and the bridge at Kons Karthaus, destroyed in the face of fierce enemy aerial and ground defense.

Pick-a-Back

After an escort mission over Germany some P-51s of the 55th Fighter Group went down through clouds to hit the deck. When they broke through they saw five odd-looking enemy planes flying at about 500 feet. "At first I thought they were buzz-bomb equipped bombers," said Lt. Col. Elwyn G. Righetti, who was leading the Mustangs. "Then I broke left and got on the tail of the middle Jerry of the lead flight. A long burst from my guns scored hits and the double plane blazed up and went down in a steep dive. A few seconds later I saw an explosion.

"I turned on the second unit, still not knowing what I was attacking, and opened fire from 500 yards. Then I discovered that the "buzz-bomb" was actually an FW-190 with props turning riding atop a twin-engined bomber, which I later learned from my combat films was a JU-88. At my first burst the JU-88 evidently jettisoned, went into a shallow dive and crashed in a small village.

"The FW, relieved of the bomber, tried evasive action but I managed to shoot it down."

All five of the pick-a-back planes were shot down. Interrogation of the other pilots revealed that the two aircraft were held together by two steel tripods, with the FW controlling flight and both planes contributing power for the combination to stay in the air.

February Blitz

Now that the returns are all in, the figures show that the greatest sustained aerial attack in history was mounted by the AAF in mid-February, before Allied ground forces pushed off for the Rhine on the 23rd, and across the Oder from the East shortly after. Between February 14 and 28, 76,000 tons of bombs were dropped on German targets, making the famed "Big Week" of 1944 (strikingly enough, on the five days from Feb. 20 to 24) seem like a baby blitz. The AAF's February average this year was a massive 5,000 tons a day, more than 3½ times the 1944 average.

Much of the total was directed against targets on the Eastern Front, now within striking range of planes from England, France and Italy. Sorties totalled 66,577, with fighters flying 33,094, heavies 25,273 and mediums 8,210. Little wonder that Nazi spokesman described the weight of air blows as "well nigh intolerable." ☆

AIR FORCE MAGAZINE

"Delighted to see you. We've been getting such inferior grades of meat lately."

HOW SHARP ARE YOU?

QUESTIONS

1. What are the men doing?
2. How many men are standing on the wrecker?
3. How many men are standing on the crew chief's stand?
4. How many hub caps can be seen on the wrecker?
5. What are the numbers on the back of the wrecker?
6. There is a searchlight on the top of the wrecker that is faced toward the airplane engine. True or false?
7. Is the hook of the C-3 wrecker hanging free?
8. Of the six men in the photo, how many are hatless?
9. Is it a radial or inline engine?
10. How many men are stripped to the waist?

ANSWERS ON PAGE 60

2308B	42-192520P	42-453553I
694344K	42-196159U	42-461771K
38- 2068C	42-196160U	42-466169C
40- 5357A	42-196165U	42-467367F
41- 952C	42-210298P	42-572319E
41- 6781C	42-214069C	42-572352E
41- 1052C	42-220847F	42-648713C
41- 16910S	42-221925K	42-659852K
41- 40252P	42-230985J	42-659860K
41- 63102C	42-236063T	42-659864K
42- 910D	42-264018F	42-660059K
42- 5707Q	42-270662R	42-672851I
42- 5968G	42-275567I	42-734320C
42- 7500Q	42-297823J	42-781235F
42- 8343C	42-333200F	42-1036946I
42- 22784F	42-387495Y	43- 5288E
42- 43207X	42-392642I	43- 6798E
42- 46261V	42-416564F	43- 8023E
42- 65417K	42-420580I	43- 8521E
42- 67918C	42-426446H	43- 8687E
42- 85226F	42-447989I	43- 16795O
42-146582N	42-450631J	43- 54314H
42-147974L		43-759541W

Return to field indicated by letter after number as keyed below

A—Coffeyville Army Air Field, Coffeyville, Kan.
B—Box 1803, Tulsa, Okla.
C—Dale Mabry Field, Tallahassee, Fla.
D—Shaw Field, Sumter, S. C.
E—Hobbs Army Air Field, Hobbs, N. M.
F—Wendover Field, Utah
G—Cochran Field, Macon, Ga.
H—Orange Country Army Air Field, Santa Ana, Calif.
I—Alliance Army Air Field, Alliance, Neb.
J—Lafayette Army Air Field, Lafayette, La.
K—Malden Army Air Field, Malden, Mo.
L—Army Air Base, Abilene, Texas
N—Harlingen Army Air Field, Harlingen, Texas
O—McCook Army Air Field, Neb.
P—Selman Field, Monroe, La.
Q—La Guardia Field, New York
R—West Annex, Porter Bldg., Kansas City 2, Mo.
S—Luke Field, Phoenix, Ariz.
T—Gunter Field, Ala.
U—Army Air Field, Lake Charles, La.
V—Perrin Field, Sherman, Texas
W—451st AAF Base Unit, Salinas, Calif.
X—APO No. 831, c/o PM, New Orleans, La.
Y—306 Guaranty Bldg., 6331 Hollywood Blvd., Hollywood 28, Calif.

FOUND

42-204671

HELD BY: Coffeyville Army Air Field, Coffeyville, Kan.

Rendezvous

(Continued from Page 3)

the navigator's position on the B-29 is probably more cramped and generally unsatisfactory than in any other type of bombardment aircraft.

If the article, "The B-29 and You," was in any way an attempt to let navigators who will eventually be assigned to the B-29s know what is in store for them, it is very much in error.

Maj. H. C. McAuliff, Washington, D. C.

Our Wright Field Office offers the following explanation:

"In the opinion of ATSC's Instrument and Navigation Branch, Equipment Laboratory, Engineering Division, the navigator's compartments on B-29s having four-gun turret installations are cramped. Remedial action is being taken to move the navigator's compartment slightly forward of the turret in late models of the Superfortress. The requirement for increased armament, however, necessitated the reduction of space available in the navigator's section until the relocation of his equipment could be made on production models of the B-29." Major Davis evidently had the improved model in mind, but he should have said so.—Ed.

Midnight Sardines

Dear Editor:

While sitting here on the midnight shift, munching crackers and sardines (very good) I happened to pick up the November issue of AIR FORCE and started to read it. . . .

When I came to your article "Lifeline to the USSR" I noticed the map on Page 25. Perhaps some one has already told you about the mistake on this map. If not, you are being told now.

Since Northway is rather a small station on the ferry route we don't get on many maps. When we do get the pleasure of seeing Northway on the map we are overjoyed. However it sort of riles us to see that we have been put on the wrong spot on the map. If you will check a military map that has us listed I believe you will find that we are in Alaska and not in Canada. . . .

Seriously, we aren't kicking too much about the mistake on the map. There isn't too much to do since this is an outpost so we do whatever we can to make the time pass. This little incident gave me something to do for a few minutes. So long and you have a swell magazine.

Cpl. C. K. Charles, APO 976

Correct: Northway is located between Fairbanks and Whitehorse in the eastern section of Alaska.—Ed.

Twenty-Four Years Ago

Dear Editor:

I have before me here in Italy a copy of your December issue. On "The Album" page the reading material under one picture says in part, "1911. Lt. M. D. Crissy, with blockbuster in hand, was the first man to toss a bomb from an airplane."

In 1911 the Honorable Ben Johnson,

(Continued on Page 57)

AAF QUIZ

WHAT'S YOUR AIR FORCE I.Q.?

Here is your monthly brain-twister. Chalk up five points for each correct answer. A score of 90 or above is excellent; 75 to 85, good; 60 to 70, not too bad; below 60, tsk, tsk. Answers on Page 59.

1. Membership in The Blister Club is composed of
- A. *Blister gunners*
- B. *B-29 crews*
- C. *Escapees who walked into neutral territory*
- D. *AAF personnel assigned to the Infantry*

2. The A-26 is a modified version of the
- A. *B-25*
- B. *A-20*
- C. *B-26*
- D. *B-24*

3. "Droop-Snooting" refers to
- A. *Intruder aircraft*
- B. *A type of bombing*
- C. *Map making*
- D. *Photo-reconnaissance*

4. Attacking targets on Borneo and the Celebes was the principal assignment of the
- A. *13th Air Force*
- B. *12th Air Force*
- C. *7th Air Force*
- D. *11th Air Force*

5. The term "little fat friends" usually refers to
- A. *Ball turret gunners*
- B. *K-rations*
- C. *B-24s*
- D. *P-47s*

6. Personnel returned from overseas may continue to wear the shoulder sleeve insignia of their former air force after they are reassigned
- A. *True*
- B. *False*

7. In 1944, the Air Transport Command evacuated approximately how many casualties from the war theaters to the United States?
- A. *3,000*
- B. *60,000*
- C. *30,000*
- D. *10,000*

8. The initials CAF stand for
- A. *Canadian Air Force*
- B. *Calling all frequencies*
- C. *Continental Air Forces*
- D. *China Air Force*

9. The speed of sound is
- A. *650 feet per second*
- B. *2,200 feet per second*
- C. *845 feet per second*
- D. *1,100 feet per second*

10. Balikpapan is located in
- A. *New Guinea*
- B. *China*
- C. *Borneo*
- D. *The Philippines*

11. The American 90 mm antiaircraft gun can fire how many 42-pound shells a minute?
- A. *5*
- B. *20*
- C. *10*
- D. *15*

12. The C-109 is a
- A. *Modified version of the C-78*
- B. *New six-engine transport plane*
- C. *B-29 used as a fuel carrier*
- D. *B-17 used to evacuate wounded*

13. In radio parlance, CW stands for
- A. *Current wire*
- B. *Communication watt*
- C. *Channel wavelength*
- D. *Continuous wave*

14. The B-29 prop is how many feet in length?
- A. *16*
- B. *10*
- C. *22*
- D. *13*

15. The Irving II is a Jap
- A. *Twin-engine bomber*
- B. *Night fighter*
- C. *Transport*
- D. *Four-engine bomber*

16. The term "bogies" refers to
- A. *Enemy bombers*
- B. *Unidentified aircraft*
- C. *Enemy fighters*
- D. *Antiaircraft guns*

17. Isley Field is located on
- A. *Saipan*
- B. *Luzon*
- C. *Guam*
- D. *Morotai*

18. If, on a combat mission, you are instructed to observe radio silence, you should turn off the VHF command set
- A. *Yes*
- B. *No*

19. Here are the locations of three Redistribution Centers. Name the fourth
- A. *Santa Monica, Calif.*
- B. *Atlantic City, N. J.*
- C. *Miami, Fla.*
- D.

20. Identify this plane ↓

technique

Development, Maintenance and Supply of Aircraft and Equipment

Pursuit Approaches — See page 52

A Bomber Path
B Low frontal
C Low side, left
D Level side, left
E High side, left
F Overhead left
G Overhead half roll
H Overhead right
I High side, right
J Level side, right
K Low side, right

Frangible Bullets

In a new gunnery training program, plastic frangible bullets are fired at specially armored and equipped P-63s so that gunners in bombing planes may improve their marksmanship by shooting at "live" targets.

With gunners blazing away at them —just as they would against attacking enemy fighters—pilots of these Kingcobras make daring passes from every angle. When bullets hit the plane's armor-plated skin, the plastic pellets splatter harmlessly and a large light in the nose blinks on for two seconds and then off again, like a pinball machine, telling the gunner that his aim has been accurate. Approximately 110 microphone pick-ups located under the dural deflector plates on the fighter transmit electrical impulses for the signal, while an additional automatic recorder in the P-63 cockpit tabulates all hits so each gunner can be radioed his score.

The shatterable bullet which makes this superior type of gunnery training possible, represents two years of tests and study by AAFTC, National Defense Research Committee and ATSC engineers, as well as ballistic experts and laboraticians at Michigan, Duke and Princeton universities. The perfected result is a lead-plastic composition bullet molded and baked like a clay marble which is tough enough to withstand the rugged treatment of a machine gun, yet so brittle that it pulverizes upon impact. It can be inserted in a .30 caliber shell casing with a minimum powder charge, and despite a muzzle velocity of 1,360 feet per second, will not puncture a piece of thick glass beyond 200 yards.

The first air-to-air firing with these frangible bullets was against an armored A-20 called the "Alclad Nag" in the late spring of 1944 at Fort Myers, Fla. After the test, the pilot reported, "The bullets sounded like rain-drops and did no more damage than water."

As a target plane, however, the A-20 was too slow and could not execute high-speed fighter tactics. Use of the P-63 for this purpose seemed indicated, since its thin, bullet-shaped nose had minimum frontal exposure and its engine and cooling ducts afforded built-in protection. Armor plate modifications increased its normal weight to 10,000 pounds gross, cut about 50 mph off its top speed and reduced its maneuverability. But at 25,000 feet—the selected firing altitude—the Kingcobra still presented a fast, difficult target.

During a recent practice session against new P-63s, hit recorders showed that gunners in a B-17 using standard training sight equipment and flexible .30 caliber guns firing frangible bullets, scored approximately 100 hits during 10 to 12 attacks by the Kingcobras.

Our New Aerial Armament

More guns, faster shooting, greater sighting accuraey, precision gunlaying and remote turret control are only a few of the elements of greater firepower now packed into the armament of AAF bombing planes and fighters. 75 mm cannon have been converted from hand loading to automatic, some gunnery stations mount four instead of two .50 caliber machine guns, and fighters can carry four extra guns in droppable containers. In addition, rocket-firing devices have been improved, armor protection has been increased, bomb racks, releases and bomb control systems have been redesigned and bombsights have been perfected to drop the right number of bombs at the right instant with the right bombing angle on the right target. New electronic devices which permit bombing by precision instrument through overcast have also been developed. And more destructive weapons are on the way.

High on the list of armament im-

Target plane used for frangible bullet gunnery training. Nose bulb goes on when hits are recorded. At left is slug showing pulverization of composition tip.

Nose on latest model B-25 bristles with increased armament. Four machine guns are mounted above three fixed rocket launchers.

provements is the remote gunnery control system, first announced on the B-29 and now adapted for use in other planes, including the A-26 and P-61. By remote sighting and operation, a gunner is able to lash out at enemy planes without being blinded by the muzzle blasts of his own guns, without exposing himself in a plexiglas turret and with no fear of hitting parts of his own plane. The turrets of the B-29 can be manned from interior sighting stations individually, or, if need be, shifted to another station by the flick of a switch, so that one gunner may control several guns from any position. A brainlike computing mechanism instantly determines where the enemy plane and bullet will meet, and corrects the pointing of the guns.

Experiments are being conducted with computing sights for fighters which provide compensation for both lead and gravity deflection. Already in combat is the K-14 compensating sight installed in P-47s and P-51s of the 8th Air Force. Altitude and airspeed settings are transmitted by manually operated potentiometers while ranging is accomplished by manipulating a small knob in the throttle.

At high altitudes and speeds, increasing pressures and pull loads on machine guns spurred the development of more efficient ammunition boosters to feed guns properly. Improved ejection systems and five flexible feed chutes now eliminate the difficulties encountered, and give the .50 caliber machine gun a substantial increase in its cyclic rate of fire. And when two such guns are contained in a compact package and slung under a wing like a droppable fuel tank, the plane's slugging capacity is considerably augmented.

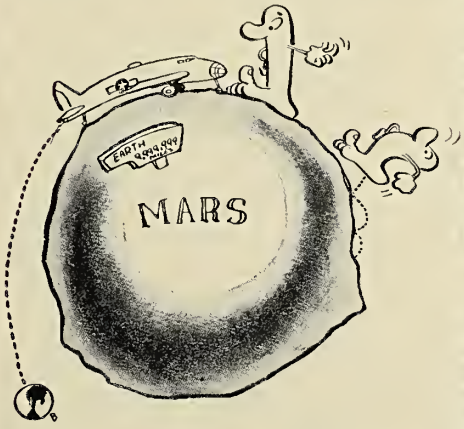
These package guns are self-sufficient

tech topics . . . about aircraft and equipment

AAF's newest gliders are the XCG-10A and the XCG-16—both boom-tailed designs. The former can carry very heavy field equipment. Under consideration for production, the CG-10 has undergone extensive tactical tests by the AAF Board, Orlando, Fla., first glider to be tested so thoroughly.

Detailed study of complete evacuation equipment with new litter installations and their placement in aircraft is being carried out with a 1/20th exact scale model of a C-54. . . . Rubber and rope fiber mats have been tested for non-skid flooring in ambulance planes where it is essential that attendants have secure footing to care for the wounded. . . . Part of every evacuation squadron's equipment is a new type of thermos jug, electrically heated.

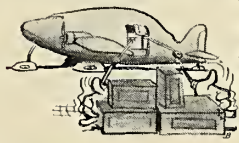
Altitude range of some new planes is so high that altimeters in use cannot record the height. Later instruments now being perfected have dial ranges from 1,000 to 60,000 feet. . . . A new combination instrument incorporates features of the radio compass and the fluxgate compass, automatically providing the navigator with an indication of true bearing through one pointer. The device is a great aid in main-



taining track and obtaining drift readings. . . . A bank and turn indicator has been modified as a dive-bombsight computer. . . . Rigid mounts for magnesyn compass transmitters in P-51 fighters eliminate erratic indications found when vibrating insulating mounts were used.

Camera clicks: A forward shooting oblique strip camera has been installed in the nose of the photographic version of the B-25. . . . A warning light for cameras shows when shutters are malfunctioning. . . . The L-5B observation plane now is fitted with special mounts for K-20 cameras which are in a vertical position, more easily operated by the observer. . . . Experimental camera installation for low-altitude, high-speed night aerial photo work is a teardrop shaped housing unit, for external application to aircraft, which contains four miniature cameras and related equipment. It can take pictures from horizon-to-horizon in the direction of flight and 60 degrees crosswise to the line of flight.

Both Douglas and Curtiss-Wright, builders of the largest in-service cargo planes, have improved models soon to appear. The



new planes incorporate special loading and paratroop doors plus other features dictated by combat experience.

Large knives for cutting away escape holes in fuselage skin are being placed in some bombers. . . . Ditching belts which help hold crewmen in safe positions during water landings are being made available for B-24s. . . . Experimental jungle emergency kits have a lightweight hammock made of fiberglass plastic.

A small auxiliary power plant for electrical supply—the first to operate successfully between sea-level and 30,000 feet—has been perfected for use on B-29s. Another Superfortress addition is the cabin airflow indicator, an instrument which reveals the condition of the air inside the pressurized cabin at all times.

A new hydraulic windshield wiper which has less tubing, weighs less and is easier to install and maintain than former types will soon go into all heavy and very heavy bombers.

A huge climatic hangar that will simulate weather extremes to minus 70° is being constructed at Eglin Field, Fla. Cold weather studies once common only to Ladd Field, Alaska, and Watertown, North Dakota, AAF test bases will be duplicated on the shores of Florida.

Aluminum cargo loading ramps with trackways for permitting vehicles to be driven aboard transport planes have been designed to replace the conventional wooden ramps which are weakened by termites and fungus growths, especially in the Southwest Pacific.

A crash protector for glider noses looks like a steel bird-cage, fits over the forward end of the glider and has deflecting effect when the glider slams into hard ground, tree stumps, rocks or other obstacles. It is used in addition to glider skids.

maintenance tips . . .

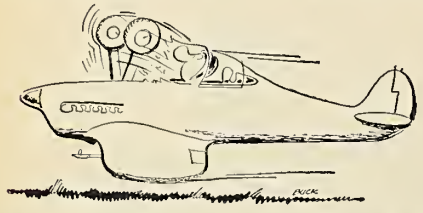
from the crew chief's stand

Some mechs' idea of hell is an abundancy of grease and no airplane tires to wipe it on. Keep oily hands away from landing wheels; if grease is spread on and allowed to remain for any length of time, rubber deterioration will result. When oiling parts of landing gear, too, care should be taken not to spill lubricants on tires. Accidents *will* happen, however, so be prepared to clean tires off immediately with naphtha or some other harmless solvent.

Know all, see all, hear all—but above all, *tell* all. That's the all-important recommendation passed on to you from Wright Field engineers when you fill out and send in Unsatisfactory Reports. Detailed information on a difficulty or modification will save planes and lives.

This is straight from the shoulder—but use it a little higher up. Fire hazard caused by gasoline leakage around the filler neck of B-24 fuel cells can be eliminated by replacing old-style gas caps with new type VA-2944-A. New Consolidated contoured gasket between wing skin and tank cap adapter, and Ford serrated gasket below the tank cap adapter, also should be used to replace the old flat-type gaskets that did not seal tightly to curved wing contours, allowing gas leakage and siphoning. The new Ford gasket is made under the same part number as the old, so later type should be specified when ordering.

Ever hear of the power of mind over motor? If you switch a G. E. for an Eclipse landing gear motor, or vice versa, without remembering to change the sten-



ciled instructions, your pilot may be cranking his landing gear the wrong way when coming in for a landing. "Up" on one installation is "down" on the other, so be sure to check the type of motor installed and then paint a bright arrow around the crank and label it properly.

By standardizing the size of patches needed to repair flak holes, Sgt. Chester Malkowich of the 15th Air Service Command in Italy has simplified and speeded up the renovation of damaged aircraft. Using four patch sizes, Sgt. Malkowich files the flak hole to the nearest standard size, places the patch on the underside of the skin, drills and rivets it in place. Each patch has a "filler" piece of metal which fills out the hole so the entire surface is flush with the airplane skin after repair.

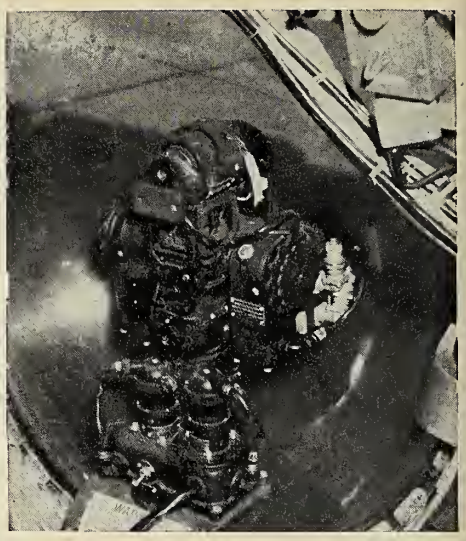
The pre-fabricated patches and the procedure for using them are now standard with mobile repair crews, and a similar system has been worked out for the 8th Air Force flak kit. A maintenance kit, incorporating this method, may be requested from TSMAC6, ATSC, Wright Field, Dayton, Ohio.

It takes jacks or better to open an emergency door sometimes, and when pilots have to bail out in a hurry they haven't got time to look around for something to bang against the hinge pin so that it loosens up. As a safeguard, the hinge pin holes should be enlarged slightly and oiled well on all aircraft. When an escape is to be made, the door latch should be disengaged before pulling the emergency release. An appropriate warning should be stenciled near the release at each emergency door to facilitate egress.

Keeping your nose clean has a specific reference to A-26 nose wheels, since an accumulation of ice or mud will jam the down lock and prevent retraction. Also, to avoid breaking side braces of the nose gear, make sure the nose wheel is straight during engine run-ups. Due to 90-degree rotation during retraction, adjustments must be very exact, and clearance between striking pad on the door down latch release lever and the nose gear strut is to be 3/16".

One of the chief reasons for failure of B-26 main landing gear axles is the strain imposed by "crabbing" on landing because of crosswind drift. Another factor is unequal adjustment of inner and outer brakes, while still another consideration is the size of the radius of the outboard brake fillet. This last is 1/16" on old struts and will be 3/8" on new ones.

Careful inspection of these items at 400 hours and at each 50-hour inspection thereafter, should reveal any cracks that may exist. Remedy is immediate replacement of the strut half-fork.



Interior sighting station at blister of a B-29 —one of five such gunnery positions coordinated by central fire control system.

units weighing 500 pounds each, including their streamlined aluminum housing, and are hung from a standard two-lug bomb rack. They operate along with the normal complement of guns from the trigger switch and are jettisonable in an emergency.

To increase the punch of cannon in aircraft, a new 20 mm gun uses more powerful ammunition, including armor-piercing shells, tracers, incendiaries and HE shells with matched trajectories. Rockets, too, have been employed with devastating effect as offensive weapons, and launching devices now are able to hurl a 4.5-inch projectile having the explosive effect of a 105 mm howitzer.

The latest type bombsight for high altitude visual bombing is the Norden M-9, a gyro-stabilized optical sight that enables the bombardier to peer through a two-power telescope and see a motionless terrain below. The bombardier draws a sightline on the target with the cross-hairs in the telescope and with a series of knobs, dials and levers sets necessary ballistics, drift, altitude and airspeed data into the sight's synchronous computer mechanism, which automatically determines the proper bomb release point. The C-1 autopilot is controlled by two knobs on the sight to maintain the plane on the proper approach line to the target.

New Airspeed Indicator

To warn a pilot when his plane approaches critical speeds that are a threat to control and structural limitations, the Equipment Laboratory of ATSC's Engineering Division has developed a new airspeed indicator for high performance aircraft which encounter compressibil-

ity effects at certain speeds and altitudes. Designated type F-4, the instrument has two pointers—a white one showing the plane's indicated airspeed and a red one that compensates for altitude variations to indicate the maximum safe speed at which the plane can be flown without encountering compressibility. When the white needle approaches the red one it indicates that the aircraft is entering a dangerous speed range.

The instrument is pressure-operated and combines the mechanical functions of a conventional IAS indicator and a barometric altimeter. It weighs approximately one pound—about three ounces more than an ordinary IAS meter—and is enclosed in an aluminum case mounted on the instrument panel.

The face of the dial has numerical readings from 50 mph to 700 mph. A small sub-dial built into the instrument permits manual setting in of the plane's Mach Number—the highest percentage of the speed of sound at which any aircraft can fly and still maintain balanced

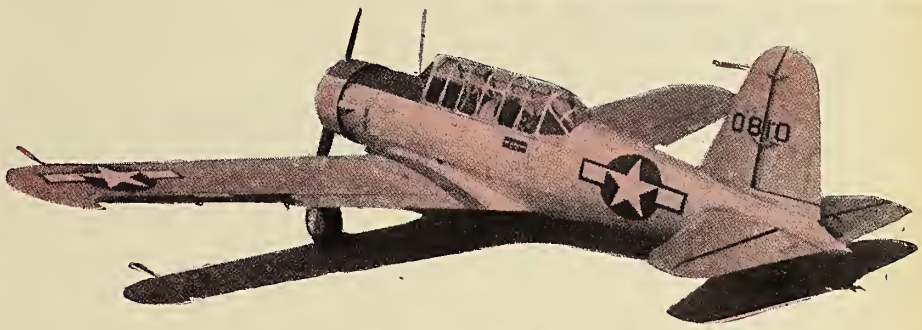
In new type airspeed indicator, red dial varies with altitude to give warning when the plane is approaching a critical speed.

control. This Mach Number can be adjusted to suit any plane, thus permitting the instrument's use on all types.

All Glass Airplanes

A new resin-impregnated glass cloth now permits the AAF to mold and bake whole fuselage and wing sections like pottery—eliminating rivets and structural members, improving aerodynamic performance and surpassing the durability of metal aircraft. A honeycombed glass core sandwiched between layers of glass-fiber cloth forms this unusual material, simplifying construction methods and allowing for soundproofing, quick repair and smooth exterior finishes. Bonding is achieved by a special resin which laminates the glass fibers and glues them to the core in a single operation, while coloring may be added to the resin to make painting unnecessary. Baking requires only a few minutes and is done under vacuum pressure.

Fuselage of this Vultee BT-15 is made up of new glass-plastic fabricating material. Experts claim advantages over metal, wood.



While still in its infancy, the glass-plastic may provide many of the answers to high-speed flight in the compressibility range. The new molding method also may supplant many time-consuming fabrication processes now necessary for wood and metal aircraft.

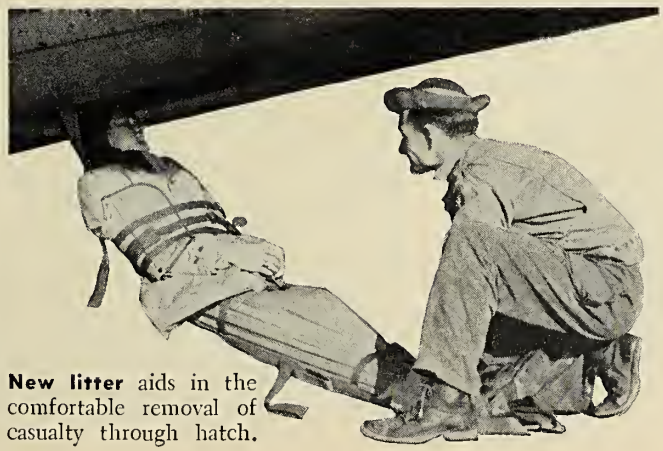
Although use of impregnated plastics for aircraft parts is not entirely new, fabricating basic structures with this material has been hitherto impractical because the fibers tested did not have the required strength. Cotton, linen, rayon and silk were all tried, but they did not have the high impact resistance and low moisture absorption of glass fibers. Now, however, the process being developed offers the possibility of greater plane speeds with less buffeting and vibration. The glass-smooth surface provides undisturbed airflow—an essential factor in high speeds that even flush-riveting in conventional all-metal construction has not fully attained. Drag is reduced, and excess noise and oscillations are absorbed by the porous core material. Also, radar equipment—which requires non-metallic housings—can be readily accommodated without installing protruding domes.

According to engineers of the ATSC Aircraft Laboratory, who initiated experiments with the all-glass plane, the new material is more rugged than either metal or wood. Comparative strength-weight figures show that it is 70 percent tougher than wood and 50 percent stronger than metal. A further advantage is that unlike wood the glass laminate does not expand or contract under specific moisture conditions and therefore may be used in any climate. In addition, it has no variation in grain or density—a variable in wood—and assures uniformity in strength and weight.

Under gunfire tests, .50 caliber bullets pierced the half-inch thick glass without shattering it. The slugs leave clean holes which can be easily patched in the same way that a tire is vulcanized, with the laminate in a semi-flexible state being used to fill the hole and then hardened to proper form under a sun lamp. Because the material does not present a hard, brittle surface, high explosive shells pass right through it without detonating.

Semi-Rigid Litter

A semi-rigid litter that is wrapped splint-like around a wounded airman, maintains head-to-hip and hip-to-toe stiffness and enables a casualty to be removed from cramped quarters in bombers and loaded into a specially-equipped L-5 evacuation plane. The new litter is made of canvas and is strengthened by strips of hard wood. It bends at the hips to facilitate a patient's passage through hatchways, while binding straps prevent movements that might aggravate injuries.



New litter aids in the comfortable removal of casualty through hatch.

Airborne Refrigerator

Paratroopers and airborne Infantrymen, who must carry their own mess units, now can be supplied by air with cold storage units that keep perishable foods fresh until ready for use. The portable-by-air Type A-1 "butcher's box" developed by the ATSC Equipment Laboratory, manufactures 48 pounds of ice every 24 hours and maintains cold-room temperatures even in the hottest climates.

The box-like cabinet weighs about 800 pounds and has sufficient capacity to store food for 100 men for four days. Six fungus-resistant wood panels are insulated by vapor seal to keep out vermin and rodents.

The unit can be operated in the air up to 10,000 feet, as well as on the ground under tropical or desert conditions. When knocked down into three crates for air shipment, it can be set up again in 45 minutes.

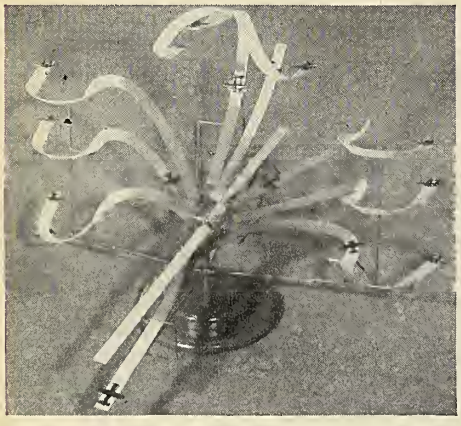
Remote-control Weather Reports

From an isolated ice-cap in Greenland, miles away from any Army installation and with no observers in attendance, weather reports are received daily by a central AAF weather station, and data on wind speed and direction, pressure, temperature, humidity and rainfall are regularly reported.

The units are automatic meteorological outposts that are set up to operate continuously as long as the fuel supply for furnishing power holds out. Improved models with extended transmitting ranges already are being developed.

Pursuit Curve Demonstrator

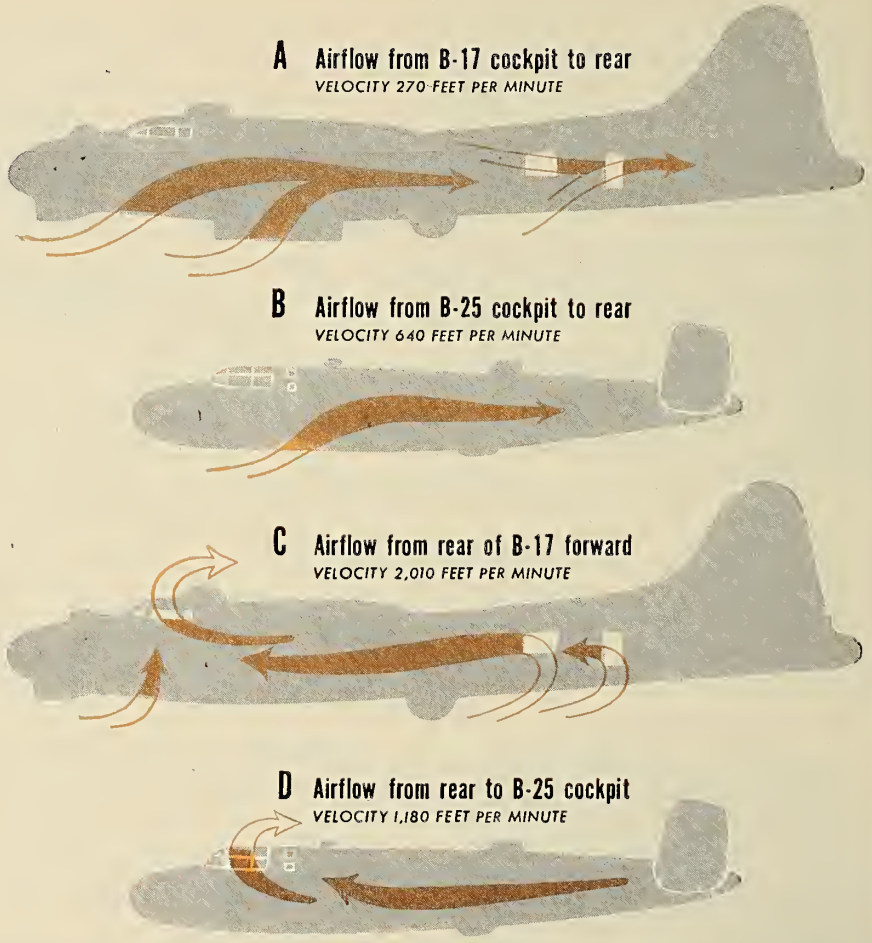
Development and distribution of a simple device of tested valve in the training of fighter pilots and bomber gunners has recently been completed by Training Aids Division, Office of Assistant Chief of Air Staff, Training, and ATSC. (See TECHNIQUE cover.)



Device graphically demonstrates to fighter pilots and bomber gunners how conventional pursuit approaches are made in air combat.

Officially known as the Trainer, Demonstrator, Type Q-10 (Fighter Approach), the apparatus consists of ten model fighters and one model bomber, each moved manually along ribbon-like individual patterns, to illustrate various types of pursuit curve attacks for a fighter intercepting a bomber flying a straight and level course. These include high side approach, left and right; level side approach, left and right; low side approach, left and right; overhead approach, left, right and half-roll; low frontal approach.

The trainer's application in flexible gunnery consists of demonstrating to gunners the types of attack to expect and the relationship of bomber and fighter during the course of aerial combat.



Diagrams show direction of airflow when proper and when improper hatches are opened to blow fire from cockpit. A. Lower nose hatch, bomb bay, waist windows and main door are open while pilots' windows are closed. B. Only lower forward hatch is open. C. Lower nose hatch, waist windows, main door and pilots' windows are open; bomb bay doors are closed. D. Only top hatch is open. Upper two sketches indicate correct combination of openings, lower two illustrate forward sweep of flames from other parts of plane.

Fire-fighting with Hatches

One of the principal hazards in flight is the sucking of flames and smoke into cockpits from fires in other parts of the plane, thus forcing pilots away from controls and making bail-outs necessary. Even minor fires, when not properly controlled, can result in abandonment of a plane.

To determine the best way of controlling interior fires, Wright Field's test engineers have conducted an extensive series of flight tests on B-17s, B-24s, B-25s and B-26s, with hatches, windows and bomb bays open and closed in various combinations.

Tests proved that ordinarily air currents are from the forward part of the plane to the rear, even when bottom and rear hatches are open. However, as soon as a cockpit window or a forward top hatch is opened, the airflow re-

verses and sweeps forward at speeds of 12 to 26 mph, blowing fire into the cabin from wings, nacelles and fuselage.

When any part of a plane is afire, drafts can be held to a minimum by keeping all hatches and windows closed and allowing normal airflow to help keep the cockpit free of smoke. However, when a fire is beyond control, crews should bail out of bottom openings only, if possible.

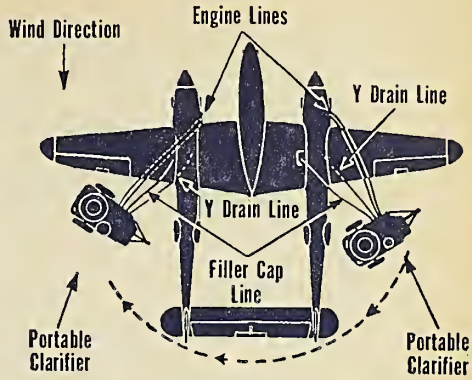
With fire in wings, nacelles or fuselage in front of the bomb bay, escape should be made through bottom hatches and wheel doors. When fire breaks out in the bomb bay, every effort should be made to extinguish the flame before jettisoning the load, since opening of bomb bay doors creates so much turbulence that burning materials will be scattered around in the plane. Fire behind the bomb bay can be controlled best by keeping all hatches closed. As fires are extinguished, rear hatches may be opened to let the smoke out of the fuselage.

New Life for Engines

When Flying Fortresses can get 1,300 hours from their R-1820 engines and Mustangs can get more than 900 hours from their V-1650s without an oil change, then something new has been added to conventional maintenance procedures. Responsible for these records—soon to be commonplace—is regular use of the AAF's new MC-3 oil filtering and clarifying unit which can increase engine life more than 33 percent, save oil by eliminating oil change periods and greatly reduce engine wear in dusty areas. Not to be confused with re-refining processes, the mobile clarifier flushes oil systems with clean, hot oil and filters all oil in the lines and tanks, removing sludge, gums, resins and abrasive particles of all kinds.

The unit consists of a 120-gallon tank with filtering elements, a gasoline heater and an engine-driven pump. Lubricant in the MC-3 is heated to temperatures of 90 to 110 degrees C and pumped through the airplane's engine and oil system, while oil to be filtered and cleaned is drawn into the clarifying tank and forced through baked fuller's earth filter blocks. If used at the specified 25-hour engine periods, only 15 minutes' operation is required for the entire engine system.

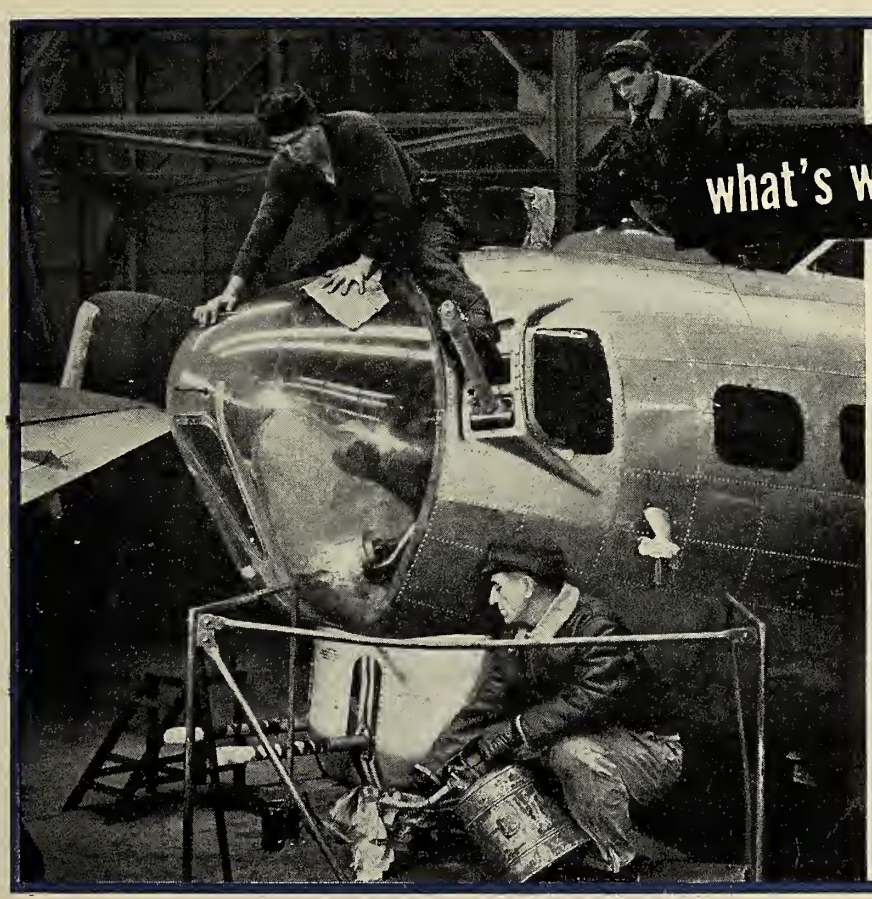
The filtering elements will de-sludge a maximum of 50 engines under the above conditions without having to be changed. A new type of non-corroding



Location of clarifiers when servicing a P-38. With engines running, plane is headed into wind, burners are at rear for safety.

core is part of the refill holding assembly, and after cleaning periodically with P-S-661 solvent, can be re-used indefinitely. A pressure drop of 20 psi through the clarifier is the warning that the filter is ready to be changed.

When the engine is not running, the unit's suction hose is attached to the plane's Y drain and the pressure hose is placed down in the oil tank to agitate the oil and stir up any deposits present. With engine turning over between 1,200 and 1,850 rpm, the pressure hose is connected to the Y drain and the suction hose to the oil tank filler neck,



what's wrong with this picture?

Rise and shine is the order of the day for bombers and their plastic panels, but it's perfectly clear that not one of these linemen knows the "no's" of a plexiglas nose. Yes, it's easy to see through the errors they are committing, but before turning to page 56 for an unobstructed view of their mistakes, polish up your information by reading TO AN01-1A-12, dated 25 October, 1944, replacing AN23-20-1, dated 10 March, 1944, which tells you all you need to know about maintenance and repair of transparent plasties. The man astride the bombardier's compartment says that there are eight malpractices being demonstrated, but if he wiped his spectacles he'd probably find more. Proving the point are T/Sgt. Emmet Plummer, Cpl. Richard Braun and Pvt. Earl Lephart, all of the 4000th AAFBU, Wright Field, Dayton, Ohio.

making use of reverse oil flow through the system. When filtering with the engine running, careful check must be made to see that sufficient oil is delivered to prevent starvation of the engine, since the clarifier is feeding back clean oil through the Y drain to the airplane's oil pump. The crew chief should stop the engine if oil pressure does not come up inside of 30 seconds.

On Pratt and Whitney engines, the blower clutch should be operated once every three minutes. With Hamilton Standard hydromatic propellers, the prop control should be operated every two minutes, and the feathering mechanism set in motion once during the filtering process without permitting the prop to drop below 800 rpm.

To purge turbo-superchargers lubricated by engine oil systems, as in the B-24, operate the turbo with the waste gate closed for five minutes, taking care not to exceed safe manifold pressures.

Acquaintance of all engineering and maintenance personnel with this process and assignment of capable mechanics to use and care for the unit can be expected nearly to double engine life while saving thousands of gallons of oil.

New Summer Flying Suit

A new light-weight birdcloth summer flying suit, standardized in December and being issued to CBI personnel at present, is replacing the cotton twill flying coverall. The new suit (Type K-1) has six zipper pockets and two open side pockets, a front zipper and a pleated back with adjustable waist tabs. The material is porous, yet windproof and insect proof, with ankle and sleeve gussets to give added protection to airmen who have to bail out over swampland and tropical jungles. Because of the cloth's porosity and thinness, airmen are kept cooler as body moisture and heat readily pass through the suit.

Latest Model Fighter Planes

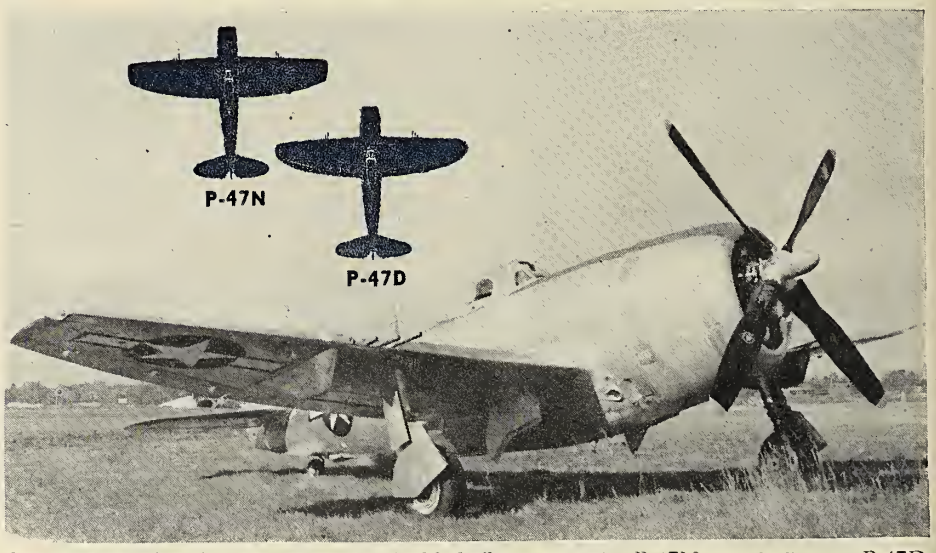
An unremitting research and improvement program has kept the P-38 and P-47 fighters abreast of all late developments.

The model "L" P-38 is generally considered to be one of the world's most formidable all-around warplanes. It has been effective in all departments of air warfare—fighting, intercepting, ground strafing, dive bombing, reconnaissance, photography, laying smoke screens, long-range bomber escort, rocket firing, low level skip bombing, tank busting, torpedo launching and towing troop and cargo gliders.

The new version has a gross weight in excess of 18,000 pounds and skims above 40,000 feet at better than 425 mph, while installation of additional fuel tanks in the wings provide a maximum ferrying range, with drop tanks, of approximately 3,000 miles. As a bomb-toting fighter, the latest Lightning can go into action with all guns and cannon blazing while carrying 4,000 pounds of bombs.

The phenomenon of air compressibility (see AIR FORCE, February, 1945) was one of the most baffling problems of high speed flying until special compressibility wing flaps were added to the P-38 to make possible recovery from dives at speeds heretofore unrealized. These "dive" flaps are operated by electric motors and are controlled by a button on the pilot's wheel. They regulate airflow under the wings and do away with air turbulence at high speed.

P-38L features compressibility flaps, new supercharger devices and a cockpit heating system.



Squared-off wing tips, greater span and added aileron area give P-47N superiority over P-47D.

The new P-47N is faster than any other Thunderbolt now being built, and its tactical radius of 1,000 miles gives it the greatest combat range of any fighter now in use by the AAF. Having a maximum gross weight of over 20,000 pounds, the plane gets its super-range from gas carried in new integral tanks and auxiliaries slung externally under wings and belly. Additional horsepower from an improved P&W engine and turbo-supercharger combination gives it higher speed, while greater wheel and tire size support the added weight.

Seven-Cylinder Cyclone Engine

The Wright Cyclone 18-cylinder twin-bank radial engine, which powers the B-29 and its cargo version, the C-97, now has a little brother. Latest addition to the family is a 7-cylinder,

aircooled radial power plant burning inexpensive low-octane fuel and developing 700 hp for short-haul cargo planes.

A two-speed supercharger drive is a feature of the engine, which also makes use of forged cylinder heads to provide greater ruggedness. These new cylinder assemblies embody longer valve guides, greater cooling fin area and a self-aligning exhaust valve seat to insure proper alignment of the valve. External oil tubes contribute to longer valve life and reduce cylinder maintenance, while oil jets in the crankcase improve lubrication within the engine.

Improved 'Jump Bottle'

A redesigned oxygen bottle assembly, recently approved by the Air Forces Board in Orlando, Fla., allows crew members to bail out from altitudes as high as 40,000 feet with the assurance of a reliable oxygen source to breathe from on the way down.

Tests performed at AFTAC and at Eglin Field, Fla., prove that the H-2 Bail Out Assembly has eliminated many of the drawbacks that made former jump bottles untrustworthy and even dangerous. Breathing from the earlier H-1 was accomplished through a tube held between the teeth, and when a man's parachute popped open there was a strong possibility that the tube would be jerked out of his mouth by the sudden jolt.

A further defect of the H-1 was that it could become a dangerous fragmentation grenade if a .50 caliber armor-piercing slug were to puncture the oxygen cylinder. In comparative demonstrations, both the old and new types were shot at with .50 caliber bullets. The H-1 exploded and flew fifty feet, while the later model's thicker skin held

H-2 Bail-out Assembly plugs right into a standard oxygen mask, saves vital moments.

on the line

with mechs around the world

Large-scale welding repairs call for a lot of acetylene, not always available in sufficient quantities. With foresight and enterprise, however, Sgt. Kenneth Doebbling, Ness City, Kansas, provided a home-made acetylene generator for the 38th Service Group of the 15th Air Force in Italy. Using the base of a German parachute container, Doebbling constructed a carbide-water acetylene generator incorporating a fuel pressure gauge and a rubber diaphragm. With slight modifications, the unit has proved so efficient that it is being duplicated elsewhere, solving supply shortages.

Time and Tape wait for no man, and when wing ejection chute openings have to be covered, these two commodities are not always at hand. As an expedient substitute, T/Sgt. Ronald Beaulieu and Sgt. Clyde Carlisle of the 461st Subdepot, 8th Air Force England, designed a one-piece metal strip cover for P-47s. Although not intended as a circumvention of TO 11-1-12, the cover effectively protects chute openings from dust while the planes are on the ground, saves valuable minutes in installation and fills the bill when tape supplies are depleted. Material is .040-inch thick, 24ST aluminum, with steel springs for adjustment into chutes. Felt strips can be fastened to the gadget to prevent it from scratching wing surfaces, while a red warning cloth may be hung on each cover to remind ground crewmen to remove it before flight.

An aircraft engine heater is adapted to warm up evacuation plane before loading wounded. L. to R. are Sgt. Frank Curtis, Plainfield, N. J. and F/O E. I. Mesnick of Youngstown, Ohio. Locale is Mitchel Field, New York.

At a 9th Air Force Service Command unit in France, orders were received to install a water injection system on the carburetor of all models of P-47s, but it was found that during the process of this modification, the power enrichment valves in the fuel economizer were thrown off, requiring a time-consuming readjustment. To solve this problem, S/Sgt. John P. Griffen, Oakwood, Mo., experimented for a few weeks and finally came up with a piece of equipment that eliminated trial-and-error methods and cut down the time needed for the job from four hours to only 30 minutes. Sgt. Griffen's device was made out of a fuel control unit reclaimed from a scrap carburetor. All the holes and bleeds were welded, with the exception of the original hole for the economizer and two air bleeds leading to the bottom side of the diaphragm. The chamber for the economizer stem was also left open, and two holes were drilled through the side of the chamber in order to prevent the formation of a vacuum. An Ames Dial Indicator, mounted on top of the economizer, and a water manometer, give readings when the spring tension is overcome by pressure from the air valve on the flow bench, so that corrections may be made accordingly.

Busiest little air depot we've heard of was an emergency field in North Africa set up to service a group of transport planes assigned to special work. It was just a temporary detail for the six GIs who arrived from their parent base with two weeks' supplies—but five months later they were still there, ready to pitch in as needed. M/Sgt. Richard Brazzeal, Macon, Ga., headed the miniature depot, which included S/Sgt. Morton Vance, Evanston, Ill., prop specialist; Sgt. John Urbanek, Buffalo, N. Y., dope and fabric expert; Sgts. Bankston Cannon, Chiefland, Fla., and Joseph Moulin, Auburn, Md., electricians, and flight crew chief Sgt. Donald Hoover, Theresa, N. Y. Sgt. Hoover checked overhauled planes in the air and also participated in a 10,000- mile, 12-day round trip to Russia with a load of belly tanks for the first B-17 shuttle bombing over the Balkans.

To save time and manpower filling orders for B-29 props, and to convey them safely over crude Indian roads over which low-strung telephone wires constantly menaced the propeller's 16-foot, 7-inch blade radius, men at a 20th Bomber Command Air Depot in the CBI have adapted an ordinary bomb dolly for use as a propeller carrier. The redesigned vehicle is smaller and lower than a trailer, yet can stand as much weight—carrying four completely assembled props. The supporting framework is composed of angle iron reclaimed from local scrap piles, while padded braces hold the blades in place. After props are mounted, the front cone assemblies are securely bolted down.

M/Sgt. Walter Eberhard, Bellevue, Ohio, conceived the idea, while Sgt. Frank Nick, Pasadena, Calif., and Pvt. Eric Bresee, Gouverneur, N. Y., drew up the plans for the conversion job.

it together and let the gas escape more slowly.

Use of the H-2 assembly is quieker and easier. It plugs right into the regular oxygen mask used on all altitude flights, enabling erewmen to protect their faces against frostbite. There is no screw valve to freeze up and stick at crucial moments and no tube to hold in the mouth. And best of all, its capacity has been increased from 20 to 22 cubic inches—an important extra margin when AAF personnel tread on thin air.

WHAT'S WRONG with the picture on Page 53

1. Let's get to the bottom of things with that can of gas the man on the crew chief's stand is tilting. Gasoline is strictly verboten for cleaning plastics, since it causes cloudiness and discoloration, especially if leaded. A clean rag and plain soap and water is best.

2. The stand is rubbing noses with the plane in a manner that will certainly result in cuts and bruises. Always watch clearances when setting up working platforms.

3. See the light? Someone has carelessly left a lamp burning inside the compartment and if it isn't put out in a hurry, the plastic will be melted and ruined.

4. "Right on the nose" may describe the GI on top, but that screwdriver in his right hand will describe some fancy scratches on the plexiglas surface. Sharp tools of any kind have no place here, so leave them behind in jobs of this type.

5. And while we're giving him the once over lightly, notice the obviously dry rag he's using to wipe off the dirty panel. Again, soap and water is the proper solution—or at least water—to loosen up the dirt and sluice it off without abrasion.

6. Gun mounts were never meant to be footrests. And that's not the 'sole' extent of the mis-step either, because a man's heel grinding against that gunner's forward sighting panel is bound to impair visibility at a position where it has to be perfect.

7. The surface of the navigator's astrodome is only as clean as the material used in wiping it, and the filthy rag being employed by the maintenance man will blur the navigator's vision when he must serve as the eyes of the entire crew.

8. What's that he's got in his other hand? Can it be sandpaper? Don't ever sand out scratches in an astrodome, because no matter how you buff and polish it afterward, the optical properties of the dome will be changed, causing additional refractive error in the navigator's sighting. Read TO AN 01-1A-12 for proper treatment.

The Intercom

As a medium for the exchange of ideas, AIR FORCE presents these answers to its Question of the Month. Replies are those of personnel recently returned from combat duty in the areas indicated.

QUESTION: What was the most important factor in maintaining your morale while you were overseas?

S/Sgt. Joseph G. Saravia, criminal investigator, Europe: "The thought that some day I would return to the States and spend a long rest with my family was the thing which kept me in good spirits. Beyond that I looked forward to the end of the war when the whole mess would be over and I'd be a civilian again. I might say that my 21 days with my family was the happiest time of my life. Should I be sent back overseas, as I expect, my morale will be maintained by the fact that the war is rapidly drawing to a victorious conclusion for us."

T/5 Frank M. Whiteley, Signals, Southwest Pacific: "Every month down on the island my name was put in a hat, along with about a hundred others, and we had a drawing. The lucky guys got to go home. That was the way they handled the rotation system since there was a whole stack of us fellows who had the same number of months overseas. There was no other way to decide who went home, and who had to stay a few extra months. Another morale builder was the arrival of a load of fresh meat. That put new spirit in the chow line."

Lt. John E. McCarthy, Jr., fighter pilot, Aleutians: "The morale in my outfit jumped up at least 100 percent the day beer rationing came in. We got about a case a month and it was up to us to make it last. We could drink it all at one sitting, or take the long view and have a bottle or two every day until it was gone. At least I heard nobody complain that his beer was warm, not up there. In fact, it was so bleak up there in the Aleutians that the slightest little pleasure of any kind at any time was an important morale builder for all of us."

S/Sgt. Morton Wasserman, flying control, France: "Come to think of it that is a hell of a hard question to answer without some deep thought. A man's morale changes with his mood and in my particular case sometimes a beer would help, and then again it might take two or three. Often it would be a letter from my wife which did me much more good than anything else. The first rumors about the rotation system did a good job of lifting the morale of men in my outfit. But usually mine came from my wife who writes an excellent letter."

Sgt. Arend Timmer, clerk, England: "Morale overseas depends most upon what kind of officers you happen to have. If you have a CO who punishes the guys who cause the trouble, and doesn't make the whole bunch suffer just to get the guilty ones, then your morale is high. I had no trouble with my morale so long as the officers showed proper consideration for their men. I especially disliked the way some of them had of making the men listen to a reading of the Articles of War and have their medical shots on their off-duty hours."

T/Sgt. Leo Walker, crew chief, MTO: "A B-26 Marauder gets the credit for keeping me in good spirits. Naturally, I think it was the best aircraft in the theater and it probably was. The name of the plane was Zero-4 and it went through several crews and I saw them go home in almost record time. Zero-4, that was the battle number, made 148 missions in 18 months and was the lead ship of the group and squadron. She was full of holes, but no man ever got a scratch. I had no problem with my morale while stationed overseas."

Rendezvous

(Continued from Page 46)

Representative from the Fourth District of Kentucky 1907-27, went to the Washington army airfield and asked to be taken up. His request was refused because of bad weather. He returned a few days later and got the same answer. A young lieutenant said that he was game enough to be the pilot if Representative Johnson was game enough to be the passenger. General of the Army Henry H. Arnold was the lieutenant of 1911. Representative Johnson was the first member of Congress to fly and the story of the flight made the front page of the Washington papers the next day. I think that it was the "Washington Post" that carried on its front page a Berryman cartoon of Johnson, Arnold and the plane.

Pvt. John W. Muir, Sr., APO 761-R.

Virginia Belle

Dear Editor:

I have just been reading your February 1945 issue of AIR FORCE.

I was interested especially in the column "On the Line" which told of a Mustang Fighter which flew 125 combat missions,

I spent thirteen months in the North African Theater as a fighter pilot, flying a P-39 Airacobra Fighter in the North African Coastal Command. The Virginia Belle, as I named my kite, flew about 210 missions over the battle-scarred hills of Tunisia.

I personally flew this ship on more than 160 missions, and it was on about 40 other missions by my fellow pilots. My group later left the African Theater and moved to CBI. The "Virginia Belle" was transferred to the 99th Ftr. Sq., and the last news I had of the "Virginia Belle" she was flying patrol missions over Anzio Beach.

I feel that the Virginia Belle has proven herself worthy of the name I gave her.

1st Lt. William H. Sheppard, Sarasota, Fla.

AIR FORCE Now Available by Subscription

Because of the many requests for personal copies of AIR FORCE, the official service journal now is available by subscription. The present system of bulk distribution to all AAF units, which provides that each copy of AIR FORCE be shared with several readers, will be continued without change. In addition, you now can receive personal copies of AIR FORCE at your Army address or have them sent to your home. The personal copies may be obtained by writing direct to the Superintendent of Documents, Government Printing Office, Washington 25, D. C. The subscription rate for 12 monthly issues is $2.00; single copies, 20c. The same rates apply to APO or Fleet Post Office addresses. Remittances must accompany all orders.

FOXHOLE MEDICS

(Continued from Page 30)

works closely with the Air Force operations. In constant communication with the intelligence office, he is advised of enemy air activity and is usually warned well in advance of the number and location of approaching Jap planes. When he receives an alert, all bed patients are removed to bomb shelters that have been constructed by the hospital staff. If an operation is underway, however, the CO keeps his ears attuned to the sky; only when he hears the drone of enemy planes overhead does he give the alarm to take cover. In no case does any member of the hospital personnel take shelter until all patients have been adequately protected.

As the hospital works under constant threat of aerial attack, facilities are available for performing operations in a completely blacked-out tent. One night in the Philippines, a red alert was sounded at 2330 and continued straight through until 0700 the following morning. The Jap planes made 35 separate air attacks or runs over the target, principally the nearby Tacloban strip. During the night more than 30 seriously injured patients were brought to the air force portable hospital. The doctors and their staff worked steadily for some 36 hours, performing operations ranging from minor surgical injuries to major abdominal surgery.

Because of the nature of injuries sustained by air force personnel in combat, the availability of the most complete surgical and X-ray facilities are of prime importance.

Other facilities of these hospitals include a refrigeration system, blood bank and plasma, sulfa compounds, an oxygen supply, equipment for administering general and local anesthesia and means of diagnosing tropical diseases.

During the Wakde campaign, one hospital served approximately 7,000 air force personnel and in addition cared for some 3,000 ground troops for which no adequate hospital facilities were available.

Portable is the right word for these air force hospitals. The entire hospital with all its equipment and service facilities, including four medical officers and 33 enlisted men, can be moved, if necessary, by air in 10 C-47 transport planes. An advanced echelon, capable of full operation for a week, can be accommodated in four C-47s. Where the tactical situation does not require air priority, the unit is transported from a rear to an advanced base in an LST. This was the case in the Philippines operation, where the hospital landed on the beach on A plus two; was set up and functioning on A plus four, or one day before the airstrip was ready to receive combat planes.

Once the portable hospital unit is ashore, it can be ready to handle patients within two hours, be completely operational within 24. During the Wakde show, a bomb dump was hit near the hospital, which was completely leveled, fortunately with no personal injuries. Twelve hours later the hospital was again handling patients. Twenty-four hours later surgical equipment that had been destroyed was replaced by air shipment of the highest priority.

When serving with an Air Task Force, as the portable hospitals have in most cases, there are three phases of activity:

1. Handling of all types of combat and operational casualties, 80 percent of which are surgical. This usually lasts for the first three to six weeks.

2. Stabilizing period of about six weeks, handling mostly routine medical cases and surgical cases incident to operations rather than enemy action.

3. Terminating period of from two to four weeks during which the hospital staff rests and prepares for next forward move.

Good food has been found an important adjunct to medical treatment under severe combat conditions. An eggnog made of dehydrated eggs and milk, with a ration of brandy added, has worked wonders to give patients confidence during air attacks.

Medical officers assigned to air force portable surgical hospitals are among the best obtainable and specially qualified. Enlisted technicians are highly trained and all are volunteers. All must be general service, under 35, and hardened to the toughest type of jungle warfare. In cases where the terrain permits no other means, essential equipment is carried in on back packs.

The staff, both officers and enlisted men, consider themselves a part of the Army Air Forces, sweating out missions with the intensity of ground crews.

The one mission of the air force portable hospital is to bring to front line air force personnel the very best in medical and surgical care. Since their inception in early 1943, they definitely have lowered the mortality rate among the seriously injured and cut considerably complications in cases of minor injuries. ☆

MAIL CALL

AIR FORCE Magazine is written for the AAF. It's your magazine and if you don't like it, tell us about it. Direct communication with the AIR FORCE Editorial Office, One Park Avenue, New York 16, is authorized on editorial and distribution matters.

While you're writing us, why not throw in an item or two for Shooting the Breeze (See Page 64 of this issue)? Here's a regular feature crying for gags, jokes, anecdotes —real or tall. If a story amuses you, we'd like to see it. Send us the raw material and we'll give you a byline.

Unit Public Relations Officers are invited to contribute to this feature. Where security prohibits them from identifying their unit, they can include the CO's name or the nickname of the outfit. We'll try to preserve such identification for the edification and amusement of all concerned.

If there's some way we can help you in your job—by running an article on a neglected subject, or by printing and answering your letter in Rendezvous (See Page 1 of this issue)—tell us about it. We'll do the best we can.

Death of a Great Flyer

ILLUSTRATED BY T/SGT. DON BROCKELL

Officially, the major's death was due to "the operational failure of his aircraft." Actually, he died in an effort to save a friend. He was killed in a heroic violation of three rules of combat flying in a P-38; rules he himself believed in and taught to his men.

Maj. Thomas B. McGuire, Jr., was no novice. He had 38 planes to his credit, just two less than Maj. Richard I. Bong. He had 720 combat hours and 240 missions. His awards included nine Air Medals, five DFCs, the DSC, two Silver Stars, two Unit Citations, and the Purple Heart.

The 5th Fighter Command published his tips on combat tactics and used them as a bible for new pilots. Certainly, he knew what to do—and, more important, what not to do. He had written: *Don't get overeager. Don't try the impossible. Don't try to outmaneuver Jap fighters.* But when a friend called for help, McGuire forgot his own words, threw away his own book, and went to the rescue.

Who is to say why pilots—good sound pilots—suddenly disregard the rules? Unquestionably, his only idea was to save the life of another pilot. He acted on an involuntary impulse and was lost doing the things he had taught other men not to do.

Major McGuire was leading a flight of four Lightnings over a Jap-held airfield at 2,000 feet in the hope of catching some Nip planes while they were taking off. A lone Jap jumped them from out of the clouds and McGuire quickly led his flight into a tight Lufbery, snaring the Jap inside. The Jap made sharp turns in a frantic effort to break out of the trap, but the P-38s kept with him all the way down to 200 feet. There, the formation scattered, the Jap made a characteristically precise turn, and maneuvered into position right on the tail of one of the Lightnings. The attacked pilot called for help and McGuire tried to respond. His plane fell off and crashed into the ground.

McGuire had neglected his own lessons. *Never attempt combat at low altitudes.* He made his attempted attack at 200 feet. *Never let your speed fall below 300 mph while flying combat in a P-38.* He was going 180 mph when he tried a roll over. *Never keep your extra gas tanks in a fight.* His tanks were not released.

Of his death, Lt. Gen. George C. Kenney, commanding general Far East Air Forces, wrote, "Major McGuire was one of the most capable fighter pilots I have ever known. We will find it more difficult to carry on without him." ☆

THE SHOOTING STAR

(Continued from Page 9)

rated in the 13 service test YP 80As, the first of which was flown on September 13, 1944.

For some time, General of the Army Arnold had furthered experiments with jet-propelled planes for the AAF. Conventional fighters had just about reached the limits of performance by engine-driven propellers. A new principle of propulsion was required. The jet engine—its output best indicated in pounds of thrust rather than horsepower—was the answer. The P-80's engine, weighing only about one-half what a conventional engine developing comparable power would weigh, is the best evidence of how effective that answer may prove to be.

Once it has been started, the jet engine requires no ignition system. A small metal plug protruding into the combustion chamber heats red hot in the first few seconds of operation. It serves to ignite the mixture of air and fuel as they are introduced into the combustion chamber, from which the hot gases pass rearward through a gas turbine. This turbine turns very rapidly under the impact of the expanding gases. A shaft connects the turbine to the compressor fan in front of the engine, supplying the power necessary for intake and compression of air. After passing through the turbine, further expansion of the gas in the venturi-tail pipe system provides the forward thrust which propels the airplane. Essentially, this is the operation which has received the attention of every belligerent in this war.

The real problem in developing jet engines lay in the turbine. Alloys had to be developed for the turbine blades that could stand terrific temperatures and still rotate at velocities up to 10,000 rpm. The engine fuel is kerosene, preferable to gasoline because it provides more energy per gallon. Thus, the dangers of handling high octane gas are eliminated. Absence of the propeller climinates another hazard to personnel on the ground near the plane. Hot gases issuing from the tail are dangerous to anyone standing immediately behind the jet, of course; but these gases cool rapidly and 100 feet away only a strong blast of wind can be felt.

The ascendancy of the AAF as a power in the air does not require some kind of marvel to be pulled out of the hangar this year in order to assure ultimate victory in the air. As the war continues, however, the P-80's contribution is likely to be closely connected with Colonel Holloway's cheerful assurance, "It's really fast, and a cinch to fly." ☆

PICTURE CREDITS

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ALL THE ANSWERS

(Continued from Page 4)

hopped a plane for England to show ETO airmen how Eglin had done it. From that time on our airmen began to knock out robomb sites.

Back in the States, the men of Brig. Gen. Grandison Gardner's Proving Ground Command grinned when they learned they had found the right solution to that problem. There was no time for back-slapping, however. Proof-testing new AAF weapons and tactics on simulated missions is a full time job. There were B-29 missions to be "flown," Tokyo to be "bombed."

Fifty miles from the nearest town, and surrounded by scrub oak and sand, aircrews and groundcrews, many of them overseas veterans, and engineers are fighting their quiet little war of dress-rehearsals against the enemy with little public notice; flying missions that pave the way for our combat airmen overseas who will be flying similar missions a month or two from now against real, not simulated, enemy targets.

Center of activities of the Proving Ground Command is Eglin Field, Fla., with a 50-mile stretch of desolate coastline on the Gulf of Mexico, 11 auxiliary flying fields and 53 gunnery and bombing ranges. Here the AAF proof-tests its equipment for combat, builds duplicates of enemy targets and learns how to destroy them most effectively.

Our Superforts already were in India when Eglin Field's Proof Division got its assignment to simulate a flight from the Calcutta area of India to Bangkok and return, with as many bombs as possible. The second phase then was to fly a similar raid that would provide information on operational performance to be expected in a flight from Chengtu, China to Yawata, Japan.

Duplicating bomb load, altitude requirements, distance and engine operation for a real mission, test pilots and engineers compiled all of their operational flight data and sent it through the 20th Air Force to the 20th Bomber Command, which used it for basic planning of the actual missions. Although Superfort pilots flying almost 1,600 miles from Eglin only saw Puerto Rico when their navigation charts had showed Yawata, Japan, they knew that their mission had helped men of the 20th to deliver more bombs on Nippon's war industries.

Development of new flight techniques is just one of scores of assignments tackled by the Proving Ground Command. Guns and cannon have to be tested on ground firing ranges as well as from the air against all types of ground and water targets. Bombs, too, must be evaluated as to their effectiveness against different types of targets. Eglin Field officers must answer such questions as: What type of bomb will knock out a steel truss-top German factory? Should demolition and incendiaries be dropped together over Tokyo? How many butterfly fragmentation bombs are needed to immobilize dispersed aircraft and trucks? What is the ultimate military utility of the V-1 robot bomb?

Answers to these questions don't pop up out of tickler files. They have to be extricated from wreckage of dummy targets and bomb-pocked ranges, and from the bottom of the Gulf of Mexico where Army-trained deep sea divers retrieve torpedoes, robombs and other types of bombs for examination. Even an Army fleet of 25 boats cruises over the Gulf to evaluate aerial target runs at sea. What the answers are must in most cases remain a secret for reasons of military security.

As soon as one project is buttoned up, the Proving Ground Command plunges ahead testing newer weapons and tactics to hurl against the enemy.

Over Burma we had learned that many types of bombs are ineffective against frail wood structures for they are too light to detonate bomb fuzes. Yet, our airmen were to be confronted by this kind of target over many parts of Japan and Japanese-occupied territory.

Eglin's proof-testers solved the problem very simply. They built three little Tokyos on one of the bombing ranges. These wood villages had alleys, narrow streets and wide streets. Some buildings were joined in block-long rows, others were laid out as individual hutments. Bucket-brigades and modern fire-fighting equipment surrounded the areas. Tests were made with various types and combinations of bombs and Eglin passed its findings along to the men who were to drop their eggs on Honshu Island's Big Tokyo.

Not all work of AFPGC is on combat equipment, however. The armor-plated P-63 is being piloted as a target plane for aerial gunnery practice. Danger to the pilot was eliminated by development of a lead plastic frangible bullet that shatters on impact (see Technique, Page 48). Extensive tests now are being made for the Training Command. To evaluate various types of gunsights under simulated combat conditions, a motion picture method using seven cameras for one gun position in a B-17 has been developed to determine the comparative accuracy of several types of gunsights when used against different types of targets under all operational conditions.

From the AAF Board at Orlando and from the Air Technical Service Command at Wright Field, AFPGC receives most of its projects and new equipment items for proof-testing. Purpose of the Command is not to develop new aircraft, accessories, supplies and equipment, but to determine the performance characteristics and capabilities of these combat tools of the AAF. At Eglin Field they are subjected to gruelling tests with the single purpose of proving their practicability for tactical uses and of demonstrating how they may be employed with maximum effectiveness.

Variety of projects handled is unlimited; B-29 windshield wipers, bomb lift trailers, airborne refrigerators, emergency control cable repair kits, carbon monoxide warning devices, fitting of pressure oxygen masks. A Stellite line gun barrel, which hardens as heat increases, will permit gunners to fire longer bursts with less dispersion. To compute depth of coastal water, which must be known before carrying out amphibious operations, a new technique of aerial shadow photography has been developed in which two airplane shadows—water surface shadow and bottom shadow—determine the depth. The flight section flies the latest planes as well as captured Japanese and German aircraft.

On the scattered land and water ranges of the huge reservation, an average of 240 projects constantly are undergoing proof tests. One range is littered with worn out trucks and aircraft that have been riddled by many types of fragmentation bombs during tests to determine most effective fuze settings. Remote controlled tanks crawl across the scrub of another range until rocket firing fighters sweep in to destroy them.

After each test mission, survey crews swarm over the ranges to measure actual dispersion and spacing of bomb strikes. To save hundreds of man hours of "bomb-hunting" after each trial, one of these ranges is instrumented to locate automatically bomb hits instantaneously through seismographic devices.

Then there are the shops where land and water targets are constructed, only to be destroyed as soon as they are set up. Keeping these ranges in operating condition and full of the right kind of targets is a 24-hour a day job for several hundred men since many of the proof missions are flown at night to test bomb sighting systems.

Detachments of AFPGC constantly work with other branches of the service at Edgewood and Huntsville Arsenals, and Aberdeen, Jefferson, Dugway and Southwestern proving grounds. Cold weather detachments carry on their work at Watertown, S. D., and Alaska.

Eglin Field, named after Col. Frederick J. Eglin, was little more than a pile of sand and a couple of poor light-plane strips when the 450,000 acre reservation was established as the proving ground of the AAF. Today, the Air Force Proving Ground Command has won its wings. Since the last week of December, 1944, it has been carried on the roster as a permanent component of the AAF; no longer is it a temporary war-baby for the duration and six. ☆

Answers to Quiz on Page 46

1. (C) Escapees who walked into neutral territory
2. (B) A-20
3. (B) A type of bombing
4. (A) 13th Air Force
5. (D) P-47s
6. (B) False
7. (C) 30,000
8. (C) Continental Air Forces
9. (D) 1,100 feet per second
10. (C) Borneo
11. (B) 20
12. (C) B-29 used as a fuel carrier
13. (D) Continuous wave
14. (A) 16
15. (B) Night fighter
16. (B) Unidentified aircraft
17. (A) Saipan
18. (B) No
19. Santa Ana, Calif.
20. B-25.

SKY SCOUTS

(Continued from Page 21)

and pick up any other information that the bombers could use.

Peaslee sold his idea to 8th Air Force headquarters which gave him permission to organize a force of scouts for its 1st Bomb Division.

Attaching himself to a fighter group and borrowing a few clerks and mechanics, he activated his first unit in June 1944. Peaslee's first thought was to use Mosquitos because they were fast and able to protect themselves. While he was experimenting with the Mosquito he was the only combat flyer as yet assigned to the scouting force. Eager to test his plan, Peaslee induced 8th Fighter Command to employ the frontal elements of their regular fighter escorts to act as scouts for the bombers. But this proved to be impractical. The primary mission of a fighter escort is to destroy enemy intercepters. Fighter pilots also were accustomed to different problems and had not been trained to recognize and interpret weather from the bomber standpoint.

It was finally decided that half of the projected scouting force should be composed of bomber pilots who had completed their tour of missions. The other half of the force would be made up of fighter pilots who would serve as wingmen and act as aerial bodyguards in case of attack.

When word of Peaslee's organization spread around the bomber bases he was besieged with volunteers. Carefully, he winnowed the applications and accepted a nucleus of veteran bomber pilots who had flown their bombardment tours during the fall, winter or spring months on the theory that these men had a better knowledge of European weather than those who flew only in the summer. Peaslee then discarded the Mosquito and adopted the Mustang as the plane his force would fly. The men he selected were given a thorough transitional training course in fighter operations and when they had passed a stiff test on weather reporting and navigation they were given the status of scout leaders. For fighter pilots, Peaslee simply requisitioned sufficient men from one of the combat groups.

For his ground staff, Peaslee picked a highly experienced intelligence officer who handles the briefing and interrogation, and prepares the various reports. Several skilled navigators who have completed tours in lead bombers were chosen to do the map work and prepare courses. Lead navigators were selected because navigation above the overcast is done wholly on course and time, and accurate planning is most essential.

Three weeks after receiving the green light from headquarters, the 1st Scouting Force flew its first mission. Since that time it has averaged better than one mission every two days.

Today the principal assignment of the scouts still is the accurate reporting of what the bombers will encounter. But this doesn't mean they don't do any fighting. They prefer, of course, to avoid combat until after they have relayed as much information to the bombers as possible. During the penetration phase of a bomber mission the scouts can channel the heavies along the clearest weather paths. It takes a fighter plane only 60 seconds to climb 1,000 feet while a heavy bomber needs five minutes to gain this much altitude. The scouts, probing through the cloud mass, are able to blaze a trail that often saves the bombers from tortuous and time-wasting maneuvers.

When the scouts reach the target they quickly evaluate cloud types, visibility, contrails, smoke screens on the ground and anything else that may be of interest to the bomber commanders. And being veteran bomber pilots themselves, the scout leaders also check the performance of the bomber formations. If some squadron, group or wing is flying sloppily the scouts will take note of the fact.

On the way home, the scouts still must keep a watchful eye on the weather, but much of the pressure is off after the bombs have gone down.

In the words of Lt. Col. Allison Brooks, of Pasadena, Calif., who now leads the 1st Scouting Force, "Contact with the enemy on the route back is always justifiable under favorable conditions."

Brooks admits that the words "favorable conditions" are pretty elastic. At various times, the small scouting formations have fought it out with Nazi intercepters even with the odds against them.

One day the scouts of the 2nd Bomb Division encountered an enemy fleet of ME109s near Magdeburg that outnumbered them nearly 25 to one. In the melee that followed the scouts bagged five of the Hun and escaped unscratched. They brought down five more enemy aircraft on a subsequent mission, again with no loss to themselves.

On another occasion, a flight of seven scouts took on more than 70 Messerschmitts. Nobody was shot down in this skirmish, but the scouts did achieve their objective of diverting the enemy planes from the approaching bomber stream.

There have been other instances, however, when it was more prudent to leave the dirty work to the regular fighter escorts. This happened once when a few elements of the 1st Scouting Force spotted more thar 60 enemy aircraft bearing down on them.

"We were 50 miles ahead of the bomber and fighter formations," Brooks recalls. "When we saw all those Huns we just tipped off the escorts and got the hell out of there. We found out later that our fighters nailed 20 of the Jerries."

Other Air Forces already have evidenced their interest. Those familiar with its operations foresee a much wider employment of the scouting force in the future, including utilization of jet aircraft instead of standard fighters. ☆

Answers to "How Sharp Are You?"

on Page 2

1. Changing an engine.
2. Two.
3. Two.
4. Two.
5. 36.
6. True.
7. No.
8. One.
9. Radial.
10. Three.

FLYING THE ZEKE 52

(Continued from Page 20)

medium bomber, may be faster than either our B-25 or B-26. However, when our unemotional test pilots analyze these figures, the chances are they will be subject to considerable shrinkage. In the meanwhile, we do have the facts on the Zeke 52, successor to the Hamp.

The Zeke 52 is a single-engine single-place fighter with a radial aircooled engine. It has no armor plate of any kind. It has no self-sealing fuel tanks. Its armament consists of two 7.7 mm (approximately 30 ealiber) machine guns synchronized through the propeller from the nose cowling and two 20 mm cannon in the wings. As Lt. Clyde Andrews, one of the Navy test pilots, says, "A lot of people used to say that the Japs were clever when they decided to substitute speed and maneuverability for pilot protection and firepower. However, close examination reveals that they were successful in attaining these essentials only at low altitudes. Above 10,000 feet, these so-called superiorities tend to disappear."

Take, for example, the rate of climb. At 10,000 feet, the Zeke 52 climbs at 2,900 feet per minute. That is from 300 to 600 feet per minute faster than the P-38G and P-47G at the same altitude. But look at the difference at 15,000 feet. There, the rate of climb of the Zeke drops off to 2,100 feet per minute while the Lightning and the Thunderbolt are from 100 to 400 feet per minute faster. At 20,000 feet, the Zeke climbs at 1,500 feet a minute, while the 38G and the 47G are faster by 500 to 800 feet a minute. And compared to the P-51B, the Zeke looks even worse, for the Mustang can outclimb it at any altitude.

You have heard, probably, that the Zeke has a terrific rate of climb. Actually, it only seems to be climbing fast because it goes up at an extraordinary sharp angle. At 5,000 feet, the Zeke climbs at about a 35 degree angle which, our technically minded experts tell us, is phenomenal. But, you will be happy to know, it doesn't get there any faster.

In comparative speeds, any of our standard fighters, including the P-40N, can move considerably faster than the Zeke. The Zeke's best speed is at 20,000 feet where it can travel at 335 mph straight and level. At that altitude, the slowest of our planes goes some 15 mph faster while the Mustang can whip along about 80 mph faster. All these figures give the Jap the benefit of an analytical doubt, for at higher altitudes—25,000 feet—the Mustang is at least 100 mph speedier than the Zeke.

"The Zeke can do most everything fairly well—at slow speeds," reports Lt. Herbert Jay, USNR. "It rolls beautifully below 150 mph, but when you get up around 170 to 185, it starts to tighten up, and at 225 mph, it is extremely difficult to roll. The aileron action is poor and the stick gets very heavy. The best characteristic of the Zeke is its ability to turn—and even then, it has that advantage only at slow speeds at low and medium altitudes. Around 150 mph, it can turn on a dime and return nine cents change. But at 225 mph, great force is re-

quired to maneuver the airplane and above that speed it is almost impossible to turn and still retain complete control. The Zeke was built to fly low and slow."

Lieutenant J. Michael Kirchberg, USNR, reports that a Jap pilot may be able to dive the Zeke at high speeds but when he pulls out, the whole plane may not come with him. "The thing is so tinny," he says, "that I was seared to death to dive it too fast for fear it would fall apart. There is very little control of the ailerons in a diving speed."

Generally speaking, the Zeke is an easy plane to fly. However, in landing, complications set in. With respect to the wheel and flap levers, the following procedure must be used to land a Zeke: Wheel lever down, flap lever down, flap lever to neutral, wheel lever to neutral before you hit the ground. Then, wheel lever down, flap lever up, flap lever back to neutral and wheel lever back to neutral.

Strangely enough, some of the instruments are exact copies of those in our prewar aircraft. The Jap radio compass, for example, is so exact a duplicate of one Fairchild instrument that some of the parts are interchangeable with it. One compass still had the Fairchild trade mark on it. The only instruments which were criticized by the test pilots were the gas gauges. Of these, Lieutenant Andrews remarked, "They are undependable and inaccurate." But he has a prejudiced opinion. On his first test flight, he ran out of gas.

Maj. F. E. "Al" Hollar, U. S. Marine Corps, takes an unfavorable view of the airplane. "It's a hydraulic nightmare," he says. "It leaks fluid continually. What's more, it's a firetrap. I don't care how fast or maneuverable a plane may be, some armor plate and leak-proof gas tanks are necessary. Don't get the idea, though, that the Japs will continue to turn out airplanes of this poor quality. Compared with the earlier Zeke, the 52 climbs about 300 feet a minute faster, it's about 150 pounds heavier, and it has about 1,300 feet more ceiling. And they are getting better."

Conclusive evidence that the Japs are getting better all the time is found in a late report on a Zeke captured in the Philippines. It was equipped with a third 20 mm cannon in addition to its standard firepower. The new cannon, mounted behind the pilot, was inclined forward so that it fired up at an angle of thirty degrees over the pilot's head, clearing the propeller arc.

Other reports indicate that the light 7.7 mm machine guns have been replaced with 12.7 mm machine guns and later models may carry a 13 mm gun.

The general test pilot opinion of the Zeke 52 adds up to this: it is like flying an AT-6 with 1500 horsepower. The Jap pilot has a very light airplane with a good engine, so the recommendation is not to try to turn with it at low altitudes and never dogfight with it. Don't follow it in a shallow loop for it will be on your tail before you level off. Given the fact that you can go higher, farther, and faster with full armor protection and superior firepower, you can select your own tactics against it. As Lt. Jay says, "The Zeke 52 is just another airplane with a couple of good characteristics." ☆

Dangerous April

Prepared by Hq Weather Wing, AAF

For airmen in the United States, the expression "Beware the Ides of March" might well be changed to "Watch the weather during April." It is in April that most aircraft accidents occur as a result of weather.

The primary reason is that over most of the United States, the characteristics of both summer and winter weather are present during April. There are six meteorological situations by which weather accidents are classified (see chart below), and four of them occur in April. They are cold frontal, pre-warm frontal, air mass cloudiness, and air mass thunderstorms.

Cold fronts may produce cumuliform clouds, turbulence in the lower levels, unstable lapse rate, showers, thunderstorms, hail, sleet, and snow flurries. Warm fronts may produce stratiform clouds, fog or ice-crystal fog, poor visibility, drizzle, and heavy dew.

Less than three percent of the accidents to Army aircraft in the United States during 1944 involved weather as a contributing factor, according to statistics compiled by the AAF Weather Wing, Asheville, N. C. Considering the fact that this country produces some exceedingly nasty weather —and the further fact that vital air schedules are met despite it—that is a record worthy of note. However, weather accounted for approximately 16 percent of the fatalities resulting from accidents, which establishes weather as the most ruthless enemy a pilot must face outside of actual combat conditions.

Normally, the greatest weather hazards in the United States are air mass thunderstorms during the summer, and air mass cloudiness and pre-warm frontal weather in the winter months. However, during the periods when these situations are most frequent, accidents due to weather conditions do not reach their expected peak. The reason for this is twofold: during the summer, pilots are usually alerted to the danger of thunderstorms, and during the winter, extra precautionary measures ground the planes when weather difficulties appear imminent. The safest months, weatherwise, are from July through October when the occurrence of warm fronts, occlusions, and air mass cloudiness is at a minimum.

In evaluating crack-ups due to weather conditions, Accident Investigation Boards usually assign responsibility to one or more of three groups: pilots, clearing and supervising authorities, and forecasters. Although weather was a contributing factor in three percent of the accidents in 1944, less than one percent of these mishaps resulted from incorrect forecasts by the AAF Weather Service. A comparable record is being maintained in every part of the globe. ☆

Distribution of Weather Accidents by Month by Type of Weather in Percentages

1944	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Occlusions	1.6	0.5	0.2	0.5	0.0	0.2	0.0	0.2	0.0	0.0	0.2	0.2
Cold Front	1.4	0.2	2.5	3.9	1.8	1.1	0.7	1.1	0.9	0.9	2.7	0.9
Warm Front	3.2	4.8	2.7	2.3	0.9	0.7	0.2	0.5	0.9	1.4	1.8	1.6
Air Mass Clouds	3.9	2.5	3.6	3.0	0.7	1.4	1.6	1.4	2.3	2.3	3.9	2.7
Air Mass Thunderstorms	0.0	0.2	0.5	4.7	7.1	5.0	2.3	2.3	1.1	0.2	0.2	0.0
Air Mass Visibility	1.1	0.2	0.2	0.0	0.5	0.2	0.2	0.0	0.2	0.5	0.2	1.1
TOTALS	11.2	8.4	9.7	14.4	11.0	8.6	5.0	5.5	5.4	5.3	9.0	6.5

Mud

Best mudder in the AAF is the caterpillar tractor, shown here helping a Thunderbolt over French terrain. Fighters taking off from muddy s
often get windows of gun cameras splattered and kills made during mission cannot be recorded. This P-47 will bomb obstacles in path of Sixth A y.

France. Broom brigade of First Tactical Air Force engineers swabs landing mat in effort to keep field operational. Straw is sometimes placed under the steel mats to stop mud from oozing up.

Marianas. When mud threatened this 7th Air Force base with ration spo g
and turned roads adjoining the field into unmanageable bogs, aviation g
neers laid coral on road surfaces, piled rations on dry base of Marston mat g

Of all the enemies that beset the AAF, mud is one of the most dangerous, tricky, exasperating. It can turn taxi strips into bogs, high morale into bleak frustration. To all those who have slogged, churned and fretted in it, these pictures are dedicated

England. Pity the poor mech who has to slosh through two feet of slime to change a tire, fix an engine, patch up a flak hole, go to the latrine.

India. The monsoon brings mud as surely as privates get KP. Indian laborers are shown here unloading gas drums under supervision of enlisted man.

Saipan. Here's Brig. Gen. H. S. Hansell sans paddle. Col. J. Montgomery is the wary pilot.

Italy. Rover sits high and dry and watches Cpls. Arthur Zeitler and Francis Vincenti dig away at the muck which has mired their bomb dolly, loaded down with 1,000-pounders.

Belgium. Slippery landing strip caused this Lightning to skid off runway. Mud forms when drainage ditches can't handle constant rain loads. Rapid wear of brake drums and linings, broken axles, stripped gears are among mud's victims. Rocks stuck in mud damage tires.

And so we bid farewell to sunny Italy, land of olive trees and goo. To GIs everywhere goes a muddy orchid for good work against a tough enemy.

SHOOTING THE BREEZE

GOT ANY GOOD STORIES? SEND 'EM IN!

South America. At one time B-29s were so secret that on their way overseas they presented many difficulties to their crews. As one colonel once complained, "I wish we could dehydrate these things and stuff them in a barracks bag." A real problem came when one of the Superforts landed somewhere in South America enroute to a combat theater. After politely explaining to a heavily braided captain of that country's Army that he could not take a ride in the plane, or even inspect it, the crew asked for a guard around the aircraft. The captain agreed. A cordon of his soldiers was strung around the B-29. Satisfied that their plane was safe from prying eyes, the crew went to town for the night. When they returned

next morning they found everything in order. No one had gotten within 50 yards of the Superfort. The crew was highly pleased—until they started out to the plane. The guards had their orders, and their guns were loaded. Frantic investigation revealed that the South American captain in charge of the guards had gone on a hunting trip into the mountains. It took 15 radio messages and two American consuls to dismiss the guards. Twenty-four hours later the B-29 got off the field.

USA.—Among the AAF combat men already returned from overseas there are some who have been assigned to office jobs in Washington, D. C. As such they have heard all the standing jokes. They know the one about a disgruntled citizen who in the dead of night stole up to an important government building and installed a placque saying: "Washington Slept Here." And others. But it remained for a bombardier, now running a typewriter, to hit two jackpots in one day. In making a telephone check on a traffic matter he heard a husky voice in a government office identify his station as "Frustrated Freight!" A short time later, calling an operations office, a sweet, sexy little voice answered: "This is Strategic Resistance."

New Guinea. The truck driver stood before Chaplain Lloyd M. Alexander and explained the purpose of his visit. He wanted the chaplain to assist him in securing Red Cross aid for his sister back in the States. Knowing the Red Cross as the surest and quickest span between troubled soldiers and their kinfolks, the chaplain asked the soldier to sit down. The young man's sad expression and soft voice emphasized the need of such a friend. After they had talked for a minute the chaplain asked what, specifically, was the sister's problem.

"Oh, she's got no problem," the boy said. "She teaches school, and her husband works in a war plant."

"Then, why do you want the Red Cross to help her out?" the chaplain asked.

"Because she was always good to me," the soldier answered. "Now, I'd like to do something for her."

South Pacific.—It wasn't the heat, but the humidity. Day after day the men of an antiaircraft crew had fought the heat and dampness. Sweat ran in their eyes and made their lips taste like the rim of a pickle barrel. After one atrocious day when the humidity was almost unbearable, the crew, grown a little daft, reported: "There was so much moisture in the air today that we shot down four submarines." The report went to headquarters. Back came a poker-faced reply: "We doubt that this is true."

Hawaii. The Vulnerable Sons of William Tell, an impromptu organization of tow target pilots, has been responsible for some cynical retorts which should live as long as this old world has need for antiaircraft gunners. The latest and maybe the best remark was made one night by a daring young man pulling target high above this southern clime. Either it was very dark, or the gunners were over-eager, but in any case the pilot noticed that ack-ack fire was coming closer to his plane than to the sleeve which was the target. He maintained a stoic silence as shells burst close on his tail, but when a couple of shots puffed out ahead of him he broke his silence.

"Hey," he screamed back to his radio man. "Tell those morons that I'm pulling this rag, not pushing it!"

Italy. It was well after midnight when a lieutenant and a private pulled up in their jeep where a mountain road forked in two directions. A lonely and brooding MP loomed in the darkness, stationed there for the purpose of guiding traffic.

"Which is the road to our lines?" the lieutenant asked.

"Take the right, sir," the MP answered.

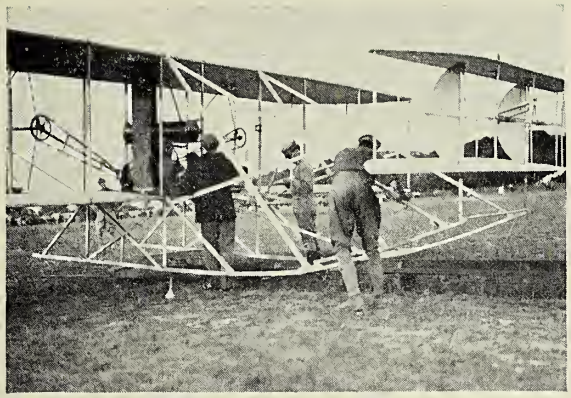
The jeep lurched along in the indicated direction.

Then, some sixth sense that hovers over privates who live right cautioned the driver to stop the vehicle. He walked ahead 50 feet in the deep gloom. And there, where a bridge should have been, was only a gaping drop of 300 feet into a gorge.

Incensed, the lieutenant and private quickly drove back to the MP. After the officer had applied a severe tongue lashing, the MP shook his head sadly.

"Can't understand it, sir," he said, "I've been sending traffic that way all night, and you're the first to complain." ☆

THE ALBUM



1909 (5 miles). This is it, men, we're all set for the big hop from Fort Meyer to Alexandria, Va. Orville Wright piloted, Lt. F. P. Lahm went along for the ride.

June 1912

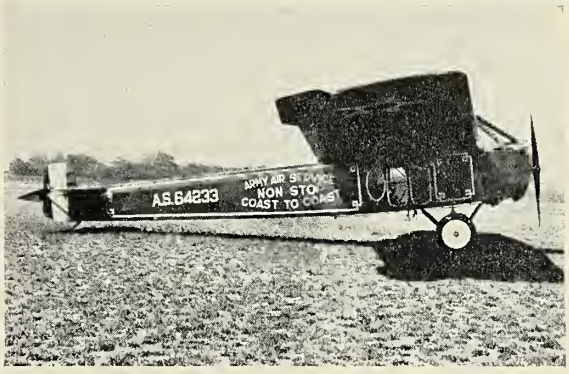
Lieut. Arnold Benumbed by Cold at High Altitude.

MAKES NEW ARMY RECORD

Nearly Loses Control of Machine When 4,167 Feet in Air.

Strength of Will, However, Saves College Park Aviator From Being Dashed to Earth—Lieut. Kirtland, by Masterful Management of Aeroplane, Steps Into Ranks of Experts—Lieut. Milling Adds to Day's Total of Twelve Flights.

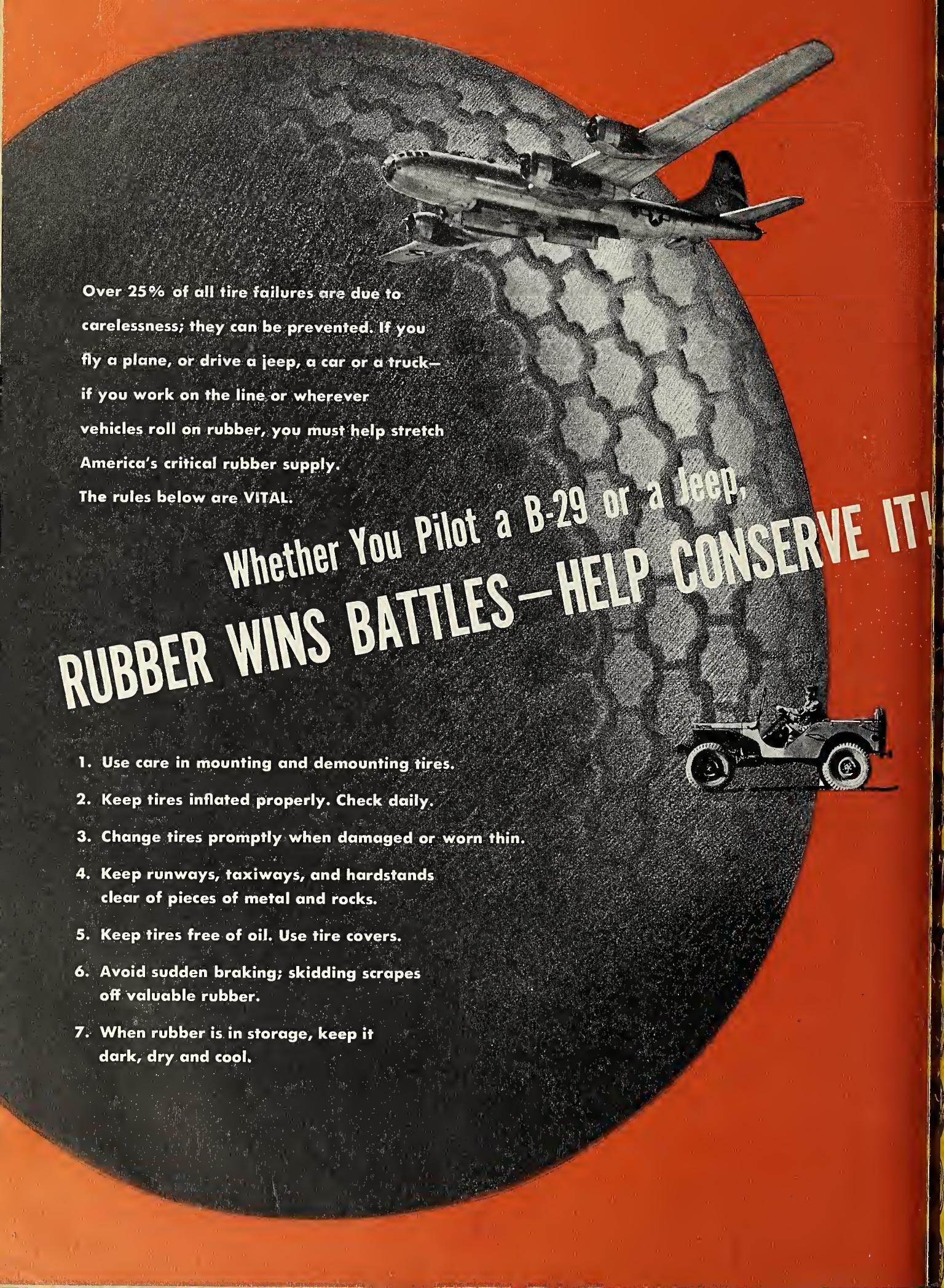
1912 (30 miles). Earl Sandt conquers the vast, icy expanse of Lake Erie. On the way back, Yours Truly's engine got nasty, abruptly landed him in a frozen heap.



1922 (2,060 miles). Flappers, Blind Pigs and Cal Coolidge were newcomers when Lts. O. G. Kelly and J. A. Macready flew this signboard from California to Indiana.

1929 (11,300 miles). For six days the Army's "Question Mark," a Fokker C-2, hovered over southern California, getting fuel transfusions and setting a world record.

The Question Mark's crew: S/Sgt. R. Hooe, Lt. E. Quesada (now Maj. Gen.), Lt. H. Halverson (now Col.), Capt. I. Eaker and Maj. C. Spaatz (now Lt. Gens.).



Over 25% of all tire failures are due to carelessness; they can be prevented. If you fly a plane, or drive a jeep, a car or a truck— if you work on the line or wherever vehicles roll on rubber, you must help stretch America's critical rubber supply. The rules below are VITAL.

Whether You Pilot a B-29 or a Jeep,

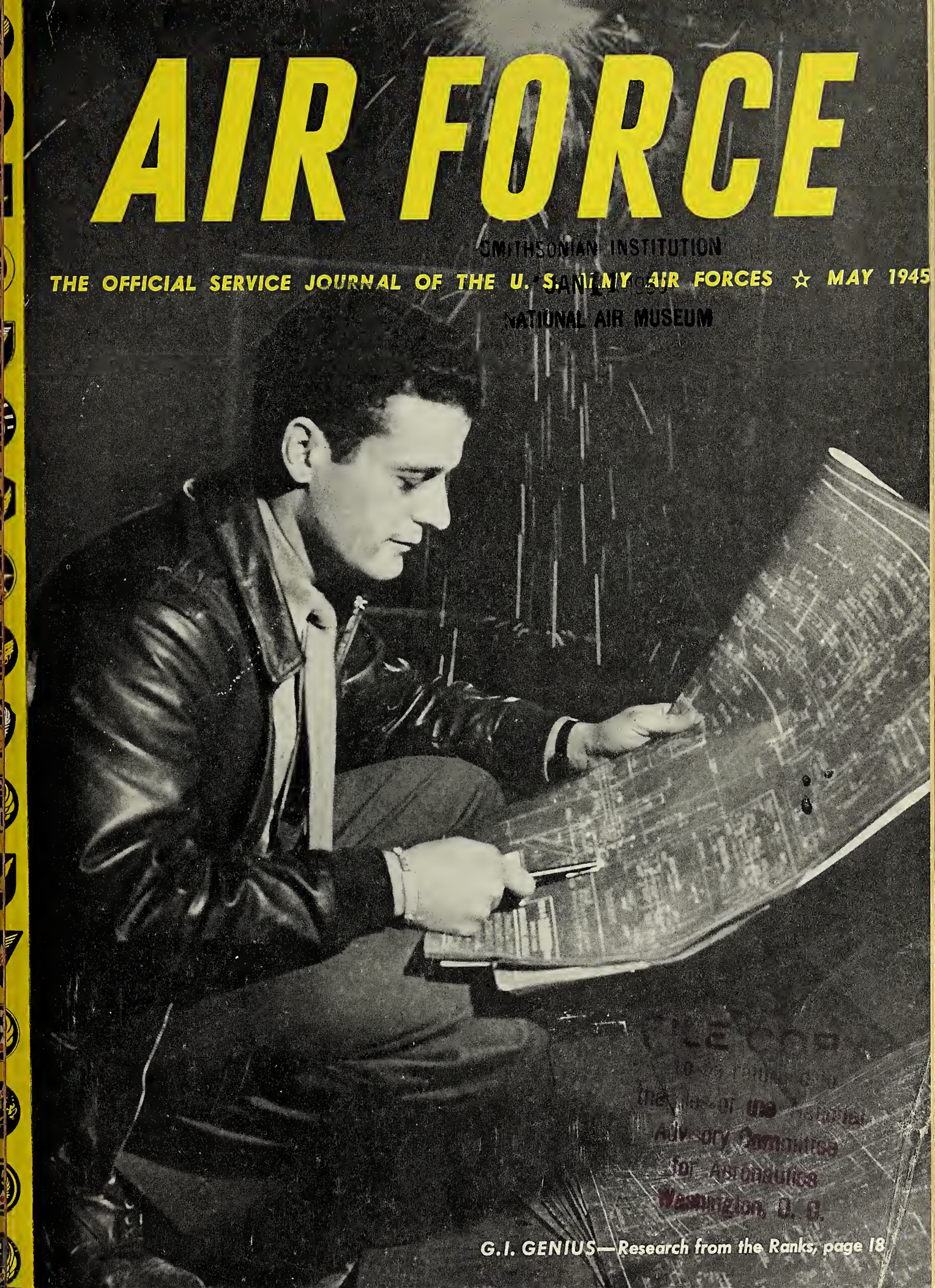
RUBBER WINS BATTLES—HELP CONSERVE IT!

1. Use care in mounting and demounting tires.
2. Keep tires inflated properly. Check daily.
3. Change tires promptly when damaged or worn thin.
4. Keep runways, taxiways, and hardstands clear of pieces of metal and rocks.
5. Keep tires free of oil. Use tire covers.
6. Avoid sudden braking; skidding scrapes off valuable rubber.
7. When rubber is in storage, keep it dark, dry and cool.

AIR FORCE

SMITHSONIAN INSTITUTION
NATIONAL AIR MUSEUM

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES ☆ MAY 1945



Advisory Committee
for Aeronautics
Washington, D. C.

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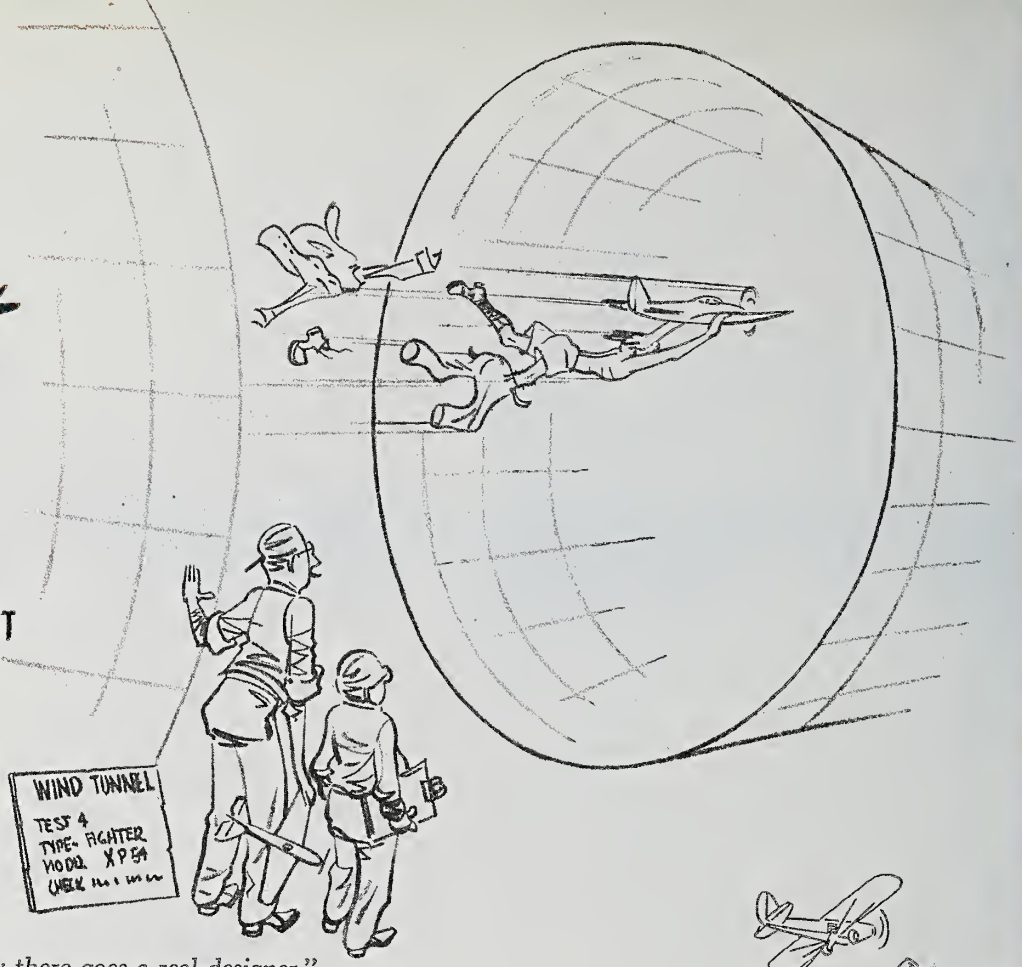
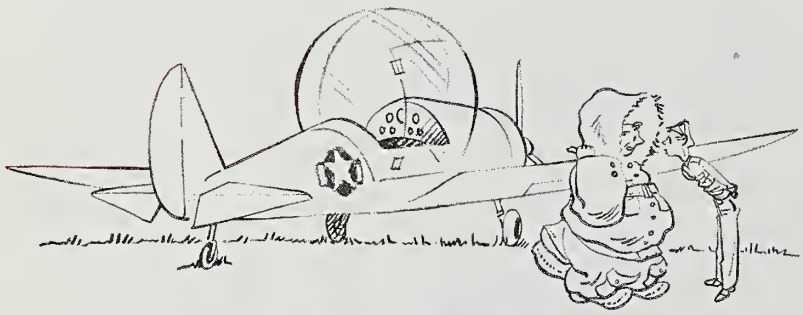
Wright Field

by CAPT. WM. T. LENT

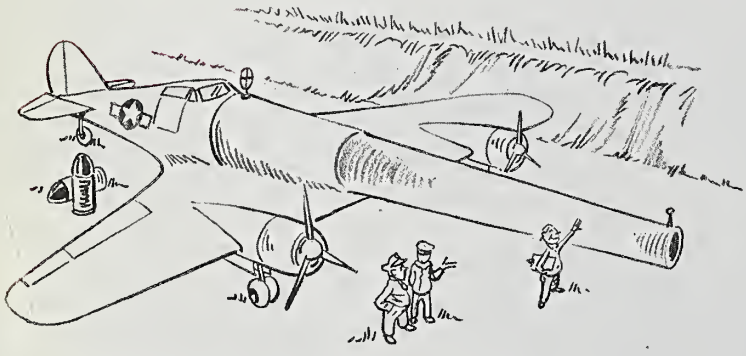


"... Now there goes a real designer."



"... and then they had to redesign the cockpit to accommodate this new flying suit."

"I heard you were looking for pickup volunteers."



"Robins feels confident that he's solved the firepower problem."

"Jeez, I'll be glad when we finish these altitude tests!"

Y 23 1945 REC'D

Rendezvous

Service Ribbons

Dear Editor:

Almost every Air Force officer and enlisted man returning from overseas is wearing the "American Theater" ribbon.

Has Section 1, Circular 68, WD, 1943, paragraph 3, been superseded?

Some of us, too old for troops, but not too old for service in the American theater, are jealous of our few service ribbons and it is a bit irritating to see a 20-year old soldier wearing, for instance, a Mexican Border Ribbon. Honest, I saw it.

Curious

See article on Page 25.—Ed.

New Plane?

Dear Editor:

Recently I had the experience of seeing an unusual aircraft. The plane was an exact duplicate of the B-24 but had only a single rudder. Is this a new aircraft as most of my friends say it is, or is it a new version of the B-24 as is my opinion?

Pvt. Chas. Palmer
Staten Island 2, N. Y.

There are two planes which might qualify as the one seen by Private Palmer, and lack of more specific information makes it impossible to say conclusively which of them it was. They are the PB 4Y-2, a Navy job, and the newest of the B-24s. Both are, generally speaking, of the basic B-24 design and both have a single rudder. The Navy plane, however, has a side blister, is a number of feet longer in the fuselage, and has a higher tail. All things considered—including the comparative number of the two planes in existence—the plane seen by our correspondent, was probably PB 4Y-2.—Ed.

Letter From Our Cover Girl

Dear Editor:

I have been receiving a lot of letters from my friends, and also from fellows whom I've never met telling me how they liked the cover on the October issue. Some were from the Pacific, some from the States, and from over here in the ETO. How your magazines get around! I have been hearing a lot of nice things about the recent issues, everyone around here is always anxious to read the next one.

Just today I was scheduled to make my first trip to Germany, 4 miles from the Rhine, but the strip wasn't ready and we must wait a day or so. I'm looking forward to going up there very much, not only because of the experience, but there must be a lot of boys who need to be carried out as soon as possible.

While in Marseilles, I had the opportunity to go to Italy and I imagine you know what's coming! Yes, I saw my husband, we had three wonderful days together in Rome. The last he had heard from me I was in N. Y., so you can guess how surprised he was when I called up from a fighter base near Pisa and said, "Honey, will you come over and pick me up?" Honestly, I didn't know quite what to say,

(Continued on Next Page)

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AIR FORCE

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How Sharp are YOU?

A Photo test of Your Observational Accuracy

Get your mind off spring, pinups and bock beer, and concentrate on this photo for 60 seconds. Yeah, there are just four fighters flying over the Alps but you better look close or you'll have trouble with the questions which you'll find on Page 45. Score 10 for each correct answer. 100 is perfect. Of 25 men we tested, top score was 80.

HOW SHARP ARE YOU? Turn to Page 45

Rendezvous

(Continued from Page 1)

and it's sure he didn't. After 22 months, we almost had to get acquainted all over again. In December I had leave and we spent three more days in Rome. We're having our honeymoon on the installment plan. He was pleased with my picture on AIR FORCE, was as proud as could be.

There has been no end of happenings here. On my birthday, which was February 24, I received my promotion to 1st Lt., and day before yesterday our squadron celebrated a year overseas. And the very latest, we have been awarded the Air Medal for 50 evacuation missions. We're very proud of them. As the girls say, "Now we wear what looks like 'fruit salad' on our blouses."

Frances Sandstrom,
1st Lt., ANC

Flight Nurse Sandstrom appeared on the cover of the October AIR FORCE *. . . remember?—Ed.*

Where Credit is Due

Dear Editor:

Being a former "Snooper" myself, I was greatly elated on reading your article published in the March issue of AIR FORCE entitled "Snoopers."

I think a great deal of credit for our successful night operations though, should be given to Lt. Col. Leo J. Foster, our original squadron commander, and Maj. Francis B. Carlson, our humorous operations officer.

These two officers displayed the highest courage and efficiency in inaugurating "our" system of nocturnal bombing. Colonel Foster, by his endless efforts, enabled the "project" to be recognized as a squadron on January 1, 1944. Since then, the name "Snoopers" has become known to every 'Seabee,' 'Cavalryman' and 'Infantryman' in the South Pacific.

Thanks again for the swell, well-written article. AIR FORCE sure keeps a technically correct publication.

Capt. Vince Splane,
Park Ridge, Ill.

Righteous Indignation

Dear Editor:

Pardon me for the intrusion, but I just read your January issue and I wished to get in touch with a Cpl. William Ryan who wrote a letter that was printed in your "Rendezvous" column.

Before I finished reading his letter I felt sure I was going crazier than usual.

I wish to state that I don't like your 2d Lt. Charles Ullritch. Any pilot who is so hot he singes the eyebrows off a girl and sets her hair on fire from the heat of his "hot" piloting should be isolated on some small isle, or sent over here to Italy.

In my opinion American womanhood is too valuable for Lieutenant Ullritch to mutilate in such a manner—even if the poor guy can't help it. After he has been overseas maybe he'll realize it. Tell him either to learn to control his "hot-stuff" or rent an icehouse for his personal barracks.

Though to tell the truth I'd like to have him meet Helen Warbly. She has made a

specialized technique of the old pre-war "cold-shoulder" business. Just before I came overseas a buddy of mine asked her for a date. She turned on her cold shoulder. Today, a year later, he is still in the hospital at St. Joseph, Mo. They keep him in a special furnace with a fire burning continuously at 200° F (higher temperature might kill him) and he is just beginning to thaw out.

HEBA-HABA-HUBA—23 SKIDOO,

Pfc. Vaun Benuamin.
APO 520

We see your point. HEBA-HABA-HUBA to you too.—Ed.

An AAF Wife Speaks

Dear Editor:

Your AIR FORCE magazine has been one of those more or less denied privileges since my husband returned overseas. I first read AIR FORCE when he was stationed in Texas for school and have always looked forward to being able to get to read it, as there seemed to be only a few copies in circulation.

He is with the 13th Air Force in the Pacific and reading your articles about his "fighting 13th" as well as the many interesting notes about the B-24s, etc., somehow brings me closer to what he's really doing and certainly gives one satisfaction.

Thank you for bringing them to the attention of the civilian public as well as Army personnel.

Is it possible to subscribe to this magazine? I'd like to keep the copies for our son to read someday.

Thank you for helping to give me a deeper insight into the feeling of our combat men who fly and fight.

Mrs. James W. Perry
Brooklyn 25, N. Y.

Thank you. For subscription details see DISTRIBUTION, *bottom of Page 1.—Ed.*

AACS In Abadan

Dear Editor:

I just finished reading Lieutenant Troster's letter in February's Rendezvous column. I can support every statement of Lieutenant Troster's as to weather. But I would like to correct him on another point.

The one statement with which I disagree is concerned with radio facilities in Iran. I was stationed at Abadan from June to September of 1943. He made the claim that there was no radio except the local tower. There he and I differ. I am a member of the AACS and I can verify that at the time he was there, we had a class A station which included air-ground facilities for both voice and CW with a range of at least 300 to 400 miles.

That he didn't make full use of our services is certainly not the fault of the radio men who suffered in that sweltering climate with him. It took the publication of a direct order and establishment of prearranged check-points to force many pilots flying scheduled routes to avail themselves of the AACS facilities on those routes.

S/Sgt. Walter M. Goldstein,
Kelly Field, Texas

(Continued on Page 58)

In This Issue

Pvt. Philip P. Antonatos, who is shown on the cover of this issue working in a wind tunnel, is a member of the GI "brain trust" of ATSC at Wright Field (See "Research from the Ranks," Page 18). Although this 28-year old wizard of the wind tunnels was inducted into the Army as recently as November 1944, he is a veteran of Wright Field's laboratories, where, as a civilian, he began employment as a junior aeronautical engineer in 1940. Pvt. Antonatos received his engineering degree at Rensselaer Polytechnic Institute, Troy, N. Y., and was employed for a year by Pratt & Whitney before going to Wright Field. He is now back doing his civilian job in uniform. The pay is not so good, but that has no effect on the enthusiasm he puts into his work. The photograph was taken by Eugene Furnish of ATSC's Technical Data Laboratory.

☆

Our correspondent who authored "Practice Makes Perfect," appearing on Page 29, Capt. Larry Bachmann, has been flying far and wide throughout India, Burma and China. In his latest report, Larry informs us that he was wearing a sergeant's stripes. No, it isn't a demotion. He was packing an extra set of thin cottons for a quick hop up north when a sergeant reminded him that China's northern frontiers are damned cold. There wasn't time to buy any heavies, so he borrowed the obliging sergeant's woolens, stripes and all. . . . Larry also explains a Burma mystery of how the boys of Air Service squadrons always managed to be on the spot to greet a troupe of beautiful USO girls the moment their plane landed. Communications was accused of being in cahoots with the ASC lads, giving them advance notice of the beauty bevy's ETA. Protested Communications, "If we knew, wouldn't we be the first on hand ourselves?" One day a crypto Joe was checking a file of radio messages between Air Service outfits. He became suspicious when he found the words "cheese" and "cake" appearing at regular intervals in otherwise routine messages. The mystery was solved when a further check revealed that whenever the USO group left one base, the ASC boys sent a message with one of the key code words inserted to their colleagues at the next scheduled stop on the tour.

☆

Take a look at the photographs of Cologne bomb damages on Pages 32 and 33, and you will see the irony of a sign posted in the city, with the following quotation from Hitler: "Give me five years and you will see what I shall make of Germany." . . . T/Sgt. Roger Coster, AIR FORCE staff photographer in Europe, who took the pictures, also writes that "I find that I only have to take a cigarette out of the package and the master race jumps to give me a light. . . . I have seen London, Paris and part of Germany. It's not pretty. In its way Paris is still beautiful, but there is something extremely sad that takes all the joy out of the city. To see Paris thus, saddens me. It was a great city." (Paris is Coster's home town.—Ed.)

☆

No fatiguing task was the research for Operational Fatigue Among Returnees (Page 11). Maj. Arthur Gordon secured most of the facts in pleasant discussion on the beach at St. Petersburg, Fla., with Lt. Col. Roy R. Grinker, Executive for Medical Services at Don Ce-Sar. On his return north, Major Gordon presented himself at an Army dispensary for an overseas physical. When a young lieutenant psychiatrist who was examining him found that Gordon had already served 18 months overseas, he nodded his head understandingly and started asking pointed questions reminiscent of the St. Petersburg discussions with Colonel Grinker. Had it taken eight months on the AIR FORCE editorial desk to give him combat fatigue? wondered our Major. It was all right, though, for a few days later the medical report arrived marked, "No symptoms of psychoneurosis." ☆

T/Sgt. Roger Coster, perched above on Cologne rubble, is definitely not a sightseer. As staff photographer for AIR FORCE, he is covering battle-scarred European war areas.

"I followed him out and found myself floating toward what appeared to be the vortex of a battle."

RHINELAND RENDEZVOUS

BY CAPT. ERIC FRIEDHEIM

AIR FORCE *Overseas Staff*

ILLUSTRATED BY SGT. LOUIS S. GLANZMAN

It was the pay-off moment of the war's greatest airborne assault. Our correspondent stood at the door of the flaming C-46. Some 800 feet below the battle already was raging. His story of what he jumped into tells how airborne troops spearheaded the big push

Weather on the morning of D-day was even better than the optimistic forecast. The sky was cloudless and spring had settled into the forests and fields surrounding the airdrome. Slowly the C-46s crawled down the narrow strips to the runway, churning up clouds of dust and sending deep thunder across the green French countryside.

The greatest airborne operation of the war was about to get underway. By 1000 hours the spearheads of a vast armada of transports and gliders, escorted by thousands of Allied fighter planes, would cross the Northern Rhine to support an all-out assault launched a few hours earlier by the 21st Army Group. We had come down to 9th Troop Carrier's 313th Group to fly as observers on this mission which was to involve the largest single concentration of troops yet carried into enemy territory by air.

The day before, Maj. Gen. Paul L. Williams, commander of U. S. troop carrier forces, told us what was to be accomplished between the hours of 1000 and 1200, on March 24. Two divisions, one American and one British, were to be

dropped by glider and parachute into a small area just east of the river, near the town of Wesel. Chief purpose of the landings was to establish a firm bridgehead for the advancing ground armies. Williams, whose troop carriers had participated in six previous airborne landings, expressed the belief that this operation might well be one of the climactic blows of the final round of the war in Europe.

The field order called for employment of approximately 1600 troop carrier aircraft and 1400 gliders to ferry the American 17th and British 6th Divisions to the landing and drop zones several miles across the Rhine, northeast of Wesel. It was an ambitious and hazardous undertaking, for it was unlikely that tactical surprise could be achieved. Our commanders were certain that the enemy anticipated a major Allied airborne attack somewhere along his Rhine positions. As countermeasures, the Germans might send up sizeable units of the Luftwaffe, possibly some jets which, because of their speed, might elude the Allied fighter escort. They also would count heavily on antiaircraft fire, for much of their flak defense is highly mobile and can be shifted from one area to another as the need arises. Finally the enemy would rely on small arms fire which often is highly effective against carrier aircraft and gliders coming in at low altitude. But all these threats had been carefully considered and Allied military leaders were satisfied that the mission could be executed with minimum losses for 72 hours.

Preceding D-day, thousands of bombers and fighters of the 8th and 9th Air Forces and the RAF swept over the Rhine seeking to reduce the enemy's gun positions and to cut communications leading into the landing area. Fortresses and Liberators concentrated on enemy airfields, particularly those that harbored jets. Intensive artillery barrages also were expected to drive the Germans inland before the airborne troops arrived. Air cooperation on the day of the landings was to be as extensive as that of the Normandy invasion. The 8th AAF promised to mount more than 2500 bomber and fighter sorties to help isolate the battlefield, while thousands of fighters and medium bombers of the 9th Air Force and the RAF were assigned the task of guarding the transport and glider stream and of striking at any flak positions that had been missed during the previous softening-up process. A force of Liberators would bring in additional ammunition immediately after the landings.

The overall plans involved little radical change in troop carrier tactics except that some of the C-47s would tow two gliders instead of one, and that formations of C-46 Commandos were to be used for the first time. Ten drop and landing zones had been plotted east of the river to which the airborne train would proceed in two parallel columns flying two miles apart. Mobile beacons had been installed across northwestern France and Belgium to assist the navigators, and a special control team would go into the invasion area in radio-equipped gliders to establish immediate communications.

I elected to fly with the 313th because this group was using the new Commandos. Each of our transports, with their greater payload, was carrying 30 paratroopers plus large quantities of supplies and ammunition. The C-46s of the 313th were transporting an entire paratroop regiment to the battlezone. The group was divided into two serials, and I had been assigned a place in the lead plane of the second serial. Our estimated time of arrival over the drop zone was 1020, and when I climbed aboard with 1st Lt. Bob Reeder shortly after 0700, the paratroopers already were in their places. They were quiet and tense as Reeder went forward with 2nd Lt. Albert Strohm, the copilot, to warm up the engines.

Shortly before 0730, Reeder wheeled the big transport into the runway and we were off. Peering through the

"... there was considerable machine gun fire coming from a patch of wood..."

window we eaught a quiek flash of the group's first easualty. One of the Commandos had craeked up on take-off and ploughed through a string of vehieles parked near the eontrol tower. Reeder got his plane off smoothly and climbed several thousand feet. There followed 30 minutes of eireling while the group maneuvered into formation, and by 0800 the 313th slid into position near the head of the long transport column. 1st Lt. John E. Hawkinson, the navigator, squinted through the dome blister and announced "We're on our way."

The tenseness and grim readiness of the paratroopers was caught by T/Sgt. Roger Coster, AIR FORCE photographer, in this photo which he took inside one of the C-46s as it waited to take-off.

First casualty was this Commando that veered off runway during take-off, ploughed through string of vehicles near control tower. Four paratroopers were injured, two jeeps flattened, truck damaged.

The run to the Rhine was smooth and uneventful. To our left we could see the column of C-47s, Horsas, CG4s and giant Hamilcar gliders stretching back to the horizon. Occasionally our fighters knifed past the slow-moving stream, ranging ahead into the danger zones. Fifteen minutes before we reached the river, Reeder flashed the alert to the jumpmasters. Tight-lipped, the troopers checked their weapons and made ready to hook up. The rest of us put on our flak suits. The three minute warning came as we flew over the Rhine, and Reeder brought the plane down to 600 feet and held her level. Haze and battlesmoke shrouded the entire area. Along the east bank the ground was barely visible. Off to the right appeared a few black bursts of flak. Reeder kept straight on course, for the troop carriers are prohibited from taking evasive action before the troops have jumped.

Four miles in he rang the bell. The paratroopers streamed out of the Commando's two doors. They cleared the plane in seven seconds and Reeder immediately increased his speed. There was more flak now, dangerously close, but Reeder continued past the drop zone before trying to make his run. Ours being the lead plane, it was necessary for us to go in deeper to avoid jamming traffic behind.

Suddenly a string of bullets ripped through the plane's belly. All of us tried to lose ourselves inside our flak suits. Finally Reeder started his turn. He almost had the nose of the Commando pointed westward when we heard the ugly sound of metal slamming through the fuselage. Within seconds the starboard engine spouted flames. The ship shuddered from the impact of another burst, and fire danced across the left wing. Thick smoke billowed into the cabin from the sides. The navigator rushed forward to the cockpit and Reeder gave the bail-out order.

Ripping off the flak suit, I groped my way to the right door, pausing momentarily to look down. We had been climbing in the turn, and I judged our altitude was about 800 feet. While I was hesitating at the door, someone hurtled past shouting "Come on! What the hell are you waiting for?" I followed him out and found myself floating toward what appeared to be the vortex of a battle. I could see the flashes of guns and hear bullets whipping past me. In the air the sky was filled with a tangle of gliders and transports, and I saw one spiral down and crash with a loud explosion in a field. Slowly I drifted over some buildings, and finally was jolted down beside some railway tracks.

I saw no one in the vicinity, but there was considerable machine gun fire coming from a patch of wood some 50 yards away. Unbuckling the chute, I crawled into a small lumber shed, which stood close to the tracks, and hid beside a stack of planks. It was a dubious sanctuary but, having lost my pistol and helmet in leaving the airplane, the lumber shed was better than nothing. Just as I had secreted myself, a Horsa glider soared down across the tracks, apparently out of control. A telegraph pole sheared off a wing, and with a sickening shower of splinters the glider crashed into a clump of trees. No one stirred in the wreckage and it appeared that all its occupants had been killed instantly. More gliders were coming down, some of them flaming, others with their wings crumbling in mid air. A few were trying to glide into a field next to the woods on the other side of the tracks, but with the low-hanging haze their pilots were having difficulty clearing the trees.

After I had been in the shed for 10 minutes, the ma-

(Continued on Page 28)

DODGING FLAK

Liberator of the 15th Air Force comes through intense and accurate flak barrage over Vienna with smoke trailing from one of its engines.

Our flyers have learned to listen carefully when flak officers speak

BY LT. HENRY W. MARSHALL
Hq. AAFPOA

Flak officers, former AA artillerymen, are now assigned to each Air Force. Their job is to help bring as many of our aircraft as possible safely home by determining what course of action will minimize the effectiveness of enemy antiaircraft fire. Certain dives, turns and changes of speed made at just the right instant may mean the difference between safety of aircraft and loss of life.

Flak officers contend that flak can be beaten if flyers have a clear picture of what they are up against. For each type of antiaircraft fire they can determine a course of evasive action which will greatly reduce the danger of being hit. They can tell pilots just what action to take when they recognize any type of antiaircraft fire. There are several methods of avoiding flak if the problem of the enemy gunner is understood and the type of AA fire recognized.

The three types are: Continuously Pointed Fire, Predicted Concentration, and Barrage Fire. The first is the most accurate and deadly.

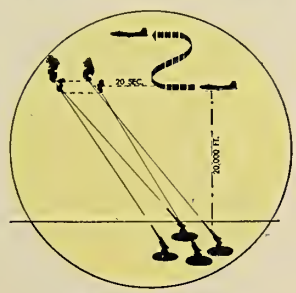
CONTINUOUSLY POINTED FIRE

By use of computors, enemy gunners can estimate speed, altitude and course, and have their guns continually aimed at the predicted position of a plane's flight. Each shot is carefully aimed at a point in the sky toward which the airplane is flying at the instant of firing.

To avoid continuously pointed fire, consideration should be given to the time it takes the projectile to get from the gun to the predicted position. The average AA projectile gains altitude at the rate of about 1,000 feet per second. Thus it takes 10 seconds for a projectile to climb 10,000 feet, 20 seconds to reach 20,000 feet, and an airplane should not continue its flight for any period of time longer than it takes a shell to reach its altitude. When under fire from enemy flak or when flying over an area known to be defended by heavy guns, never hold the same course and altitude for more seconds than the altitude in thousands of feet, unless actually making a bombing run.

CONTINUOUSLY POINTED FIRE

PREDICTED CONCENTRATION



BARRAGE FIRE

Enemy gunners when using continuously pointed fire must estimate where the target aircraft will be at the end of so many seconds, and their lead must be correct to within relatively few yards if the burst is to cause damage. Therefore, to avoid being hit, a formation flying at 20,000 feet in a continuous course in one direction must turn within 20 seconds. The shells will then burst along the previous heading rather than the present one. After taking a new heading the gun batteries will require approximately 10 seconds to compute their firing data. This plus the 20 seconds required for the projectile to reach 20,000 feet, makes 30 seconds that the formation can continue on its new

(*Continued on Page 59*)

Drop on Corregidor

Three Air Forces take part in an all-out air assault that enables Paratroopers and Infantry to seize "The Rock" in record time, with little loss

BY MAJ. THOMAS C. HARDMAN

AIR FORCE Overseas Staff

The lead bombardier spotted his target through a break in the clouds that hung over Manila Bay. Seconds later, a B-24 load of 500-pound bombs whistled down on "The Rock." The air blitz of Corregidor had begun.

One by one, Liberators of the 13th Air Force's 307th Bomb Group passed over cloud-obscured Cavite, made 180-degree turns over Manila's docks and came in for their bomb runs on the tiny island bastion that stands like a sentry at the entrance of the harbor.

The Libs dropped their 500-pounders from 17,000 feet, and 85 percent of them blanketed the target. Tremendous blasts tossed smoke and debris more than 3,000 feet into the air. One string of bombs found an underground dump, and the resulting explosions appeared to race along an L pattern as the earth erupted.

This strike was made shortly after noon on January 23. By the 17th of February, Corregidor was to become the most heavily bombed island per square foot of any invaded area in the Southwest Pacific.

The green light for the air blitz on "The Rock" had been flashed several days earlier in the form of an unqualified compliment to airpower. General of the Army Douglas MacArthur, commander in chief of Allied Forces in the Southwest Pacific Area, and General George C. Kenney, commanding general of the Far East Air Forces, were discussing ways and means of capturing Corregidor, held as a bloody symbol since its day of surrender back in May of 1942.

"General," remarked the FEAF commander, "Let me take Corregidor from the air."

General MacArthur hesitated but a moment and replied:

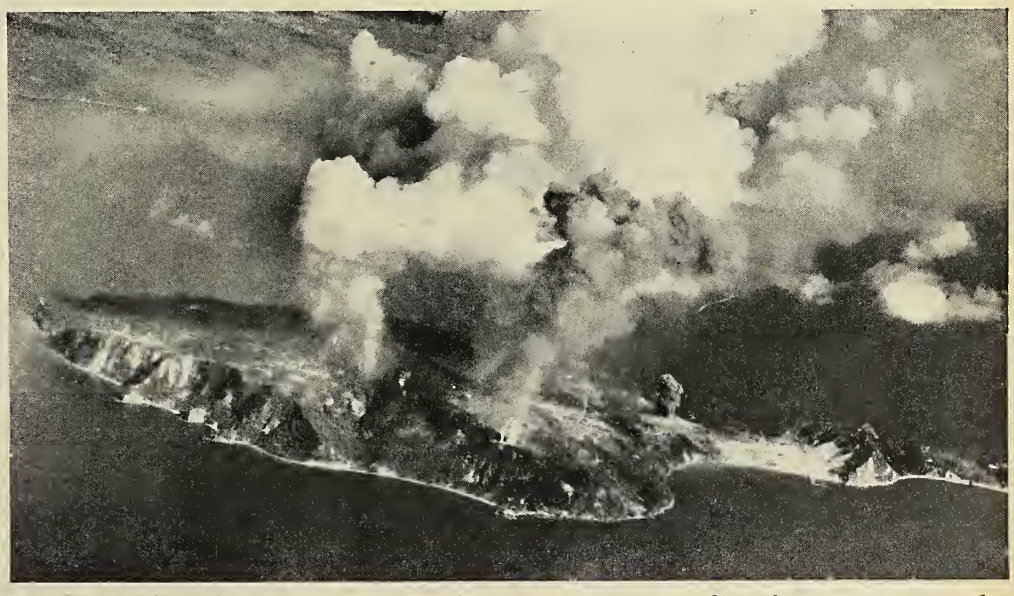
"All right, George, go to it." And the discussion ended.

The 13th's Liberators, which had gashed the jugular vein of Jap supply arteries to the south with strikes on such "out-of-reach" targets as Truk, Yap and Balikpapan, were the first of the big parade of heavies, medium and fighters to be thrown against the three and three-quarter mile long island.

Next came three veteran groups of the 5th Air Force—the 90th's Jolly Rogers, the Ken's Men of the 43rd and the 22nd's Red Raiders. These were the boys who had pasted the Japs almost daily since the 1942 days at Port Moresby.

B-24s of the 7th Air Force joined in from their bases in the Central Pacific.

(*Continued on Next Page*)



3,128 tons of bombs were dropped to soften up target areas totaling about one square mile.

← Back to "The Rock" by air. Paratroopers led the attack, alone held Corregidor for 40 minutes.

Skeletons that once were barracks and administrative buildings lend vivid testimony to the effectiveness of 25 days' air bombardment.

For two weeks, the heavies poured it on in rotation. Enemy antiaireraft batteries, feeble from the start, were knocked out in short order, and by the first week in February, B-24 photo-reeons could eirele unmolested 3,000 feet over the island.

The Japs had dug in. This called for the A-20s of the 3rd Attaek Group. The Grim Reapers they are called. These low-level bombers and strafers rounded out General Kenney's team for the first half. 7th Air Foree Libs in the morning, 13th Air Foree B-24s at noon, 5th Air Foree A-20s in the afternoon, and 5th Air Foree Libs just before evening ehow.

Ton by ton, the bombs roeked "The Roek." The heavies with their 500 and 1,000-pounders blew up gasoline dumps, neutralized artillery positions and dug deep into the underground labyrinth, while the A-20s skimmed in low with bombs and .50 ealiber bullets to pound away at the cliffs and ridges where Jap troops were burrowing in for a stand against inevitable invasion.

Then came the fighters—P-38s, P-47s and the newly arrived P-51s—with 1,000-pound bombs shaekled under eaeh wing. Buzzing the island from every eoneeivable angle, they made 134 sorties and dropped 133 tons of bombs They dropped them into eave mouths, barraeks building doorways, gun pits, and, just to make sure, they fired 3,000 rounds of .50 caliber ammunition into the targets.

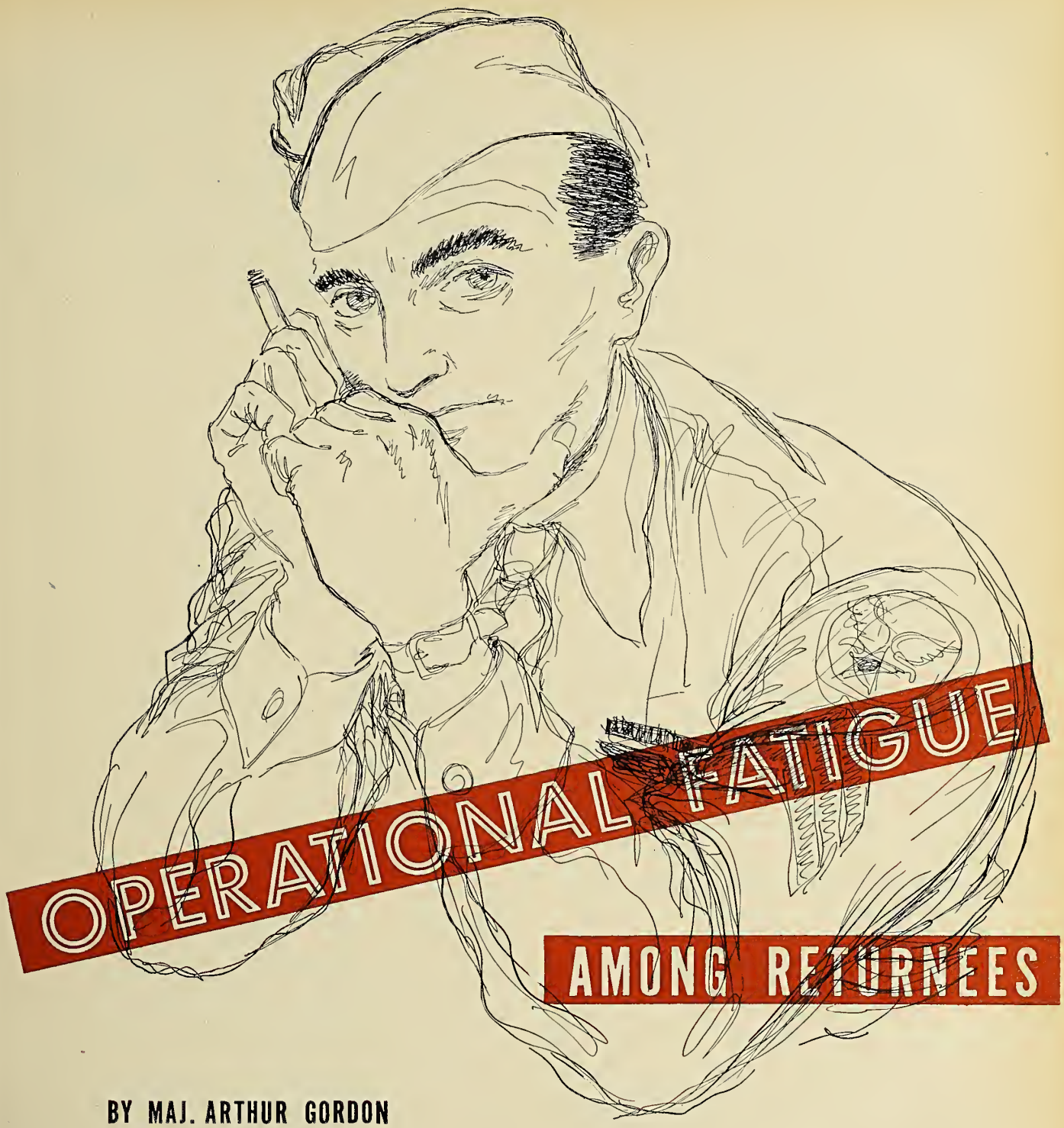
In 25 days, Corregidor had been shaken by 3,128 tons of bombs in target areas totaling little more than one square mile—a reeord unmatehed in the Southwest Paeifie. By contrast, Lae, in the two months prior to its invasion, had taken less than 1,000 tons. During the weeks preeeding the Finschafen landing, Allied bombers had expended 134 tons over that target. Cape Glouecster had taken 5,000 tons of bombs, but they had fallen on an area of over nine square miles. Nearly 2,000 tons had blasted Hollandia, but here again the area eovered at least 10 square miles. Wakde Island, with its two square miles, probably had been Corregidor's elosest statistieal eompetitor, absorbing almost 2,000 tons of bombs during a relatively brief bombardment period.

Now, with Corregidor's surfaee defenses and much of its

(Continued on Page 57)

A low-flying transport drops its "stick" of 8 paratroopers squarely on target—the shattered, bomb-pocked ruins of Corregidor's "Topside."

Like schools of fishes, landing craft carry infantrymen to the narrow beaches after the paratroopers had taken up positions.



OPERATIONAL FATIGUE AMONG RETURNEES

BY MAJ. ARTHUR GORDON
Air Force Staff
ILLUSTRATED BY T/SGT. DON BROCKELL

Every combat flyer suffers to some degree from operational fatigue.

Here's what happens when symptoms of war neurosis appear or persist after the fighting man returns from overseas.

It's common knowledge in the AAF by this time that practically everyone who participates in combat exhibits symptoms—usually mild but sometimes severe—of a state that has been loosely termed "operational fatigue". Experience has shown that because of these symptoms a small percentage of combat crew members has to be grounded permanently in mid-tour. A larger percentage receives rest-home treatment and carries on. Most flyers finish their tours without being grounded at all.

It would seem a logical assumption that once the combat tour is ended, and the dangers which caused the emotional

stress removed, the flyer would stop showing signs of operational fatigue and pick up the threads of normal existence where he left off. But this is not always the case. A considerable number of returning combat personnel are exhibiting a delayed reaction which surprises and worries them a good deal. They think it strange that the impact of normal living should throw them off stride when they have weathered, with apparent success, the more violent adjustment from normalcy to combat. But it does, and the phenomenon is worth discussing, because once the causes are understood it does not seem so strange, and in the milder cases, at least, understanding provides a great impetus toward recovery.

In many of these cases symptoms have revealed themselves by the time the returnee has completed the 21-day leave that awaits him when he steps off the boat or plane that brought him back to the U.S.A. These symptoms vary considerably in kind and in intensity. They may include insomnia, irritability, depression, restlessness, nervousness, startle reactions, nightmares, loss of weight, aggressive behavior and others—all familiar signs of operational fatigue (see "The Conquest of Fear" in May 1944 AIR FORCE).

But why should these symptoms appear or persist when the primary cause of them—combat—has been removed?

The best place to find the answer to this question is at the Don Ce-Sar Convalescent Hospital, St. Petersburg, Fla., which has done pioneer work in the treatment of operational fatigue and is the source of the information in this article. AAF psychiatrists at the Don Ce-Sar feel that an explanation of their work in the pages of AIR FORCE, even if somewhat over-simplified, may be useful in allaying unjustified fears among flying personnel and in educating unit commanders—and even flight surgeons—in the importance of recognizing and providing competent treatment for this condition.

The condition is not limited to combat flyers. There are plenty of non-combat stresses overseas (and at home, for that matter) which may result in emotional disturbances. Poor living conditions, deep dissatisfaction with a job, poor relationship with other members of the unit, bad news from families—all these things result in emotional strain. Some individuals are much more susceptible to such stresses than others; men with unhappy childhoods, for example, are more likely to be affected than those who came from secure, happy homes.

But the majority of cases is found among combat personnel, for the obvious reason that combat imposes by far the severest emotional strain. And it is with such men that the Don Ce-Sar Hospital Staff—and consequently this article—is primarily concerned.

Let it be said to begin with that almost all the officers who enter the Don Ce-Sar—and a slightly lower percentage of enlisted men—are successfully returned to duty usually in about six weeks. And let it be stated further that absolutely no stigma is attached to any patient. Operational fatigue is as valid an affliction as measles or sinus trouble, and in most cases is as directly attributable to combat as the loss of a finger to frostbite or a foot to flak. The only difference is that operational fatigue, when cured, leaves no such unpleasant scars.

But to get back to the basic question of why there should be a "relapse" once a man has successfully completed his combat tour and returned to the States: the reason, basically, is that the man has changed—has changed under the abnormal stress of combat to the point where he is not fully prepared to face the lesser strains of modern living.

He has probably changed physiologically. In combat his body has mobilized tremendous energies to meet and repel

"... most important part of the patient's treatment consists of careful interviews with a psychiatrist."

danger. His endocrine system has worked overtime. Sometimes these energies have been expended; sometimes not. As his tour progressed, he became keyed up higher and higher. When the stress is suddenly removed, that tension does not immediately disappear. Some individuals can shift back into low gear fairly quickly; others can't.

But more important than these physical changes are the psychological ones. These may have taken place without the individual's knowledge. So long as he is a member of a group, acting as part of a unit rather than as an individual, his behavior tends to follow the group pattern. But when he comes home this unit identity is lost; he is an individual facing new problems and realities by himself. And sometimes these realities are too much for him.

Let's take a hypothetical Lt. Johnny Jones. He comes from good stock, was as "normal" as the next person before the war. He flew his tour of missions, including some rough ones, without recourse to the flight surgeon. Like everyone else, he was scared and admitted it, wanted desperately to get his tour over with and go home. And finally he did.

But when he reappears at the redistribution station after his 21-day leave with his family, he knows that he is not himself. He is irritable, given to flashes of hair-trigger temper. He is fed up with civilians. He is not sleeping well. He is restless and tense.

If he is wise, he will report these symptoms to the doctors who give him a routine examination at the redistribution station. It may be, however, that he decides not to tell, thinking (mistakenly) that they are not important, or that they will disappear. If his self-control is good—and it may be—he will probably be assigned to a duty station, and open trouble will not appear until later, when there is always the danger that his symptoms will not be recognized for what they are and he may find himself receiving disciplinary action instead of medical care.

However, let's assume that Johnny Jones tells the doctors frankly that he is off his feed. In all probability they will send him down to the Don Ce-Sar or one of the other ten AAF Convalescent Hospitals for rehabilitation. Admitted as a patient at the Don Ce-Sar, he undergoes thorough physical, psychological, psychiatric, and laboratory examinations. After a week, his particular case will be classified and treatment begun accordingly. It will probably consist of periodic discussions with a psychiatrist—described more fully later—and participation in certain group activities. It certainly will not be unpleasant. Physical surroundings are ideal, food is excellent, entertainment includes everything

from dances to deep-sea fishing trips, wives may live near the hospital,—in short, everything is done to make life as pleasant as possible for the patients without spoiling them.

It is a mistake, however, to suppose that rest or change or physical exercise alone will solve Johnny Jones' problem. The problem is emotional; he cannot 'forget' it or simply put it out of his head. It goes deeper than that.

If Johnny Jones were to ask a psychiatrist to explain the cause of his irritability and aggressive tendencies in plain English, he would probably hear something like this:

"Like everyone else who flew a complete tour of missions, you were subjected to emotional strains and stresses that at times were well-nigh unendurable. You kept going because of your pride in yourself and your unwillingness to let the unit down. But your subconscious self was not so conscientious about facing unpleasant realities as you were. It preferred to turn away from them, escape from them. It chose to regress toward the period in its experience where there was the least stress, the least tension—that is, toward your childhood, where people loved and cared for you, where nobody tried to hurt or kill you, where there were no problems, no tensions.

"The conscious you was not aware of this. You looked forward with almost frantic anticipation to the day when your tour would be over, when the danger would cease, when you could go home. The word 'home' meant everything you desired: freedom from peril and pain and the grim necessity of forcing yourself into impossible situations. That hope was what kept you going. Without it, you would have found combat too much for you.

"Well, so you got through. You came home. You came home as an individual, remember, not as a member of a team welded together by training and combat. As an individual you were hungrily looking for these gratifications, the prospect of which had sustained you through your combat tour. And what happened? You didn't get 'em.

"A man who has lost his unit — and with it some of his self-confidence—feels reassured . . ."

"You found, for example, that the Army still expected you to be a man and accept responsibility and do a job. You found that your family was delighted to see you and loved you very much, but your wife (if you had one) wanted you to take over the somewhat snarled bank account and your mother wanted you to make decisions regarding her insurance and your kid brother wanted guidance in his high school courses. They—naturally—expected to rely on you as they always had. You wanted to lean on them.

"What happened, in your case, when you discovered that these immature longings were not granted? What happened when gratification was denied? Child-like, you had a tantrum. You became irritable and hostile. You were mad with everybody.

"Cleverly, because it likes to save face, your ego concealed the true state of affairs from you. You said you were angry with civilians because they 'didn't know there was a war going on', or 'didn't make enough effort'. What you really meant was that they didn't make enough effort about you. Still convinced that the Utopia you pined for existed in civilian life, you blamed your unhappiness on the Army. You said you wanted to get out. You said your mother needed you. What you really meant was that you needed her.

"Other returnees show different symptoms. Some are depressed. Some have gastric disturbances. But your case is fairly typical, a case in which combat stress produces a longing for a completely tranquil, dependent existence which, in this 20th century of ours, simply does not exist."

Now, explaining his case to Johnny Jones may help, but it will not cure him overnight. He must grasp the truth emotionally as well as rationally. His ego, which has become weak, needs to be strengthened.

Participation in group activities helps. A man who has lost his unit—and with it some of his self-confidence—feels reassured as soon as he finds himself part of a team, even if it's a basketball team or a class in radio-building. Human beings are gregarious. They draw strength from associating with one another.

But the most important part of the patient's treatment consists of careful interviews with a psychiatrist. The role of the psychiatrist in these interviews, broadly speaking, is to ascertain the basic conflict in the patient's mind, to locate by questioning and insight the source of the anxiety, then hold it up to the light of reality where the patient can recognize it for what it is and deal with it accordingly.

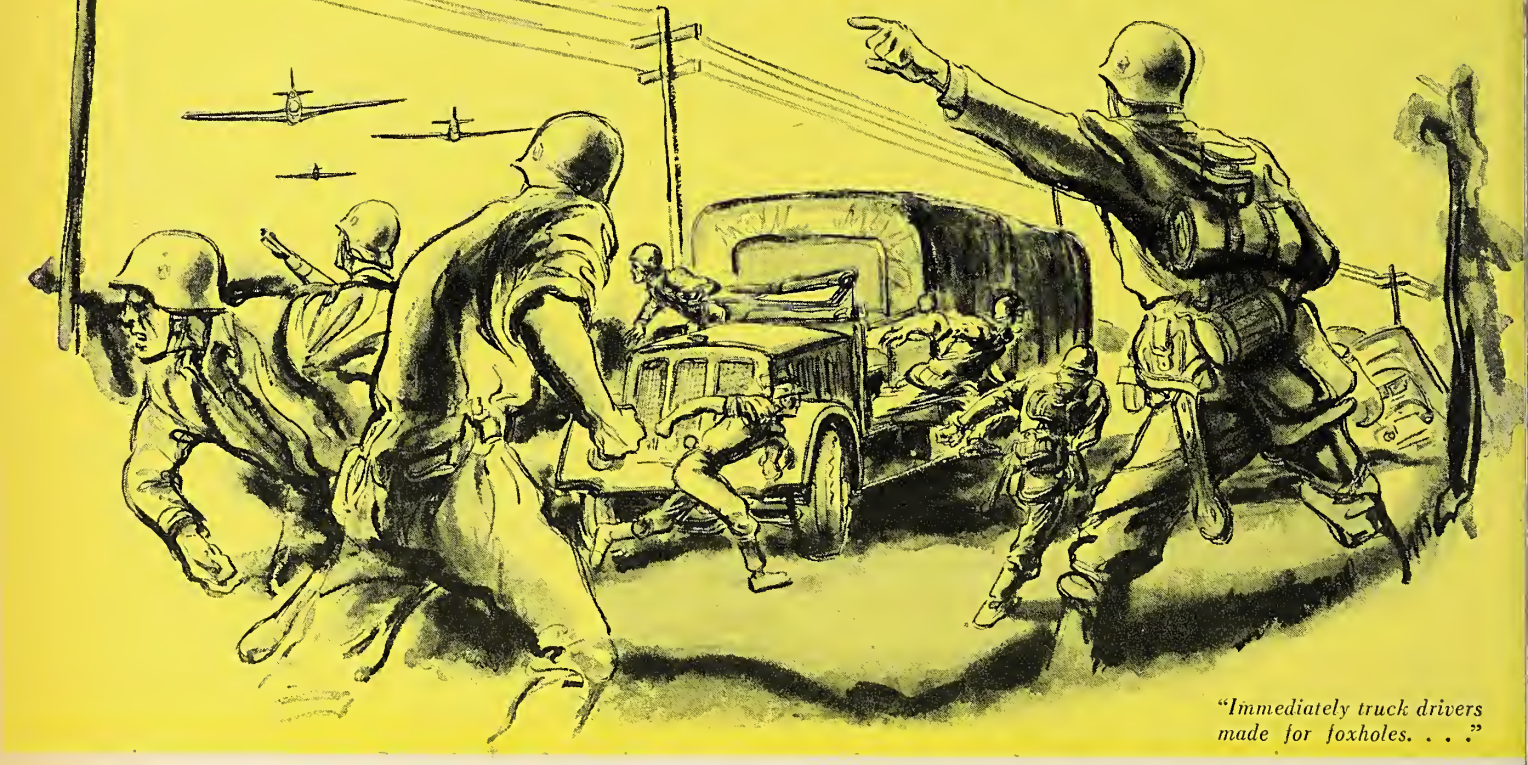
No two cases are exactly alike, but three imaginary and somewhat over-simplified case histories may serve to illustrate the basic principles. Assume that we have three returnees, X, Y, and Z. Sgt. X, a Liberator tail gunner, exhibits an abnormal degree of depression. He is brooding about something, and it does not take the psychiatrist very long to determine that Sgt. X has a deep sense of guilt. It goes back to the day that he went to the flight surgeon and got himself grounded because of a head cold, and his Liberator took off without him and did not come back. Sgt. X was terribly upset at the time. He wondered if perhaps he were not to blame. If he had not gone to the flight surgeon that day, if a new man had not been in the tail, maybe his friends would not be dead. But they were dead, and the sergeant wondered, secretly and guiltily, if perhaps he were not responsible, if perhaps he had not killed them, if perhaps he were little better than a murderer. . . .

These guilt complexes are very common—and usually respond readily to treatment. Once the incident is reconstructed, the psychiatrist can expose it to simple logic. He can point out that it would have been criminal for the

(*Continued on Page 34*)

THIS IS YOUR ENEMY

. . . it's your life or his



"Immediately truck drivers made for foxholes. . . ."

Flak, Still. Although intensity of German flak varies with the importance of the objective and cloud cover at the target, bomber crews are unanimous in reporting that it is still there. Shortage of ammunition has reduced non-visual fire unless the formations are attacking vital targets. Fire encountered during bad weather over the Rhine Valley indicates the importance attached to targets in that area. German training directives emphasize firing with the unaided eye. German skill in this operation is not surprising, considering the experience the Nazis have had. Batteries often fire without tracer and without intricate aiming devices.

In the German handbook on flak tricks there has always been a chapter on luring fighter-bombers within easy range of the guns. Pilots of the 9th Air Force noticed three trucks moving slowly back and forth along a road west of Neuss. The highway was lined with trees, and foxholes were dug at intervals of 50 feet. The fighters dived to attack. Immediately truck drivers made for foxholes, and light flak came up from positions on both sides of the road. The planes got off unscratched, despite the ordeal of fire and the unexpected hazard of a double row of high-tension wires running across the highway.

Red-Ball Routines. Twentieth Bomber Command crews have recently noticed that the Japs have refurbished their bag of older tricks. Decoy planes, which were reported in such large numbers over China early in the war, have simplified their tactics. Whereas the decoys once employed all kinds of aerobatics to distract American pilots, they now rely on simple diversionary attack. Often these diversions are used in connection with formal attack, such as the "Chow Line." This "line" usually forms on the right of the formation, carrying its attack through with diving turns to the left.

The "Chow Line" is not the only type of fighter attack nicknamed by the Superfortress crews. The 11-12-1 o'clock, high speed power-dive attack has been christened The Twelve O'clock Express. The dive usually breaks under the bombers, but occasionally the Jap fighter zooms for his getaway. Flying through the formation has become much more common recently. Reminiscent of the tags given German tactics are other nicknames giving the "true picture" of Jap attack—Sidewheeler, Tail Pecker, and Belly Button.

Because of the speed and altitude of most B-29 attacks, Jap fighters have not always been able to use cloud cover or the sun. Occasionally they have attempted to sneak through vapor trails, but they lose rate of closure in this way, and B-29 gunners can spot bandit vapor when they see it. Mathematical-minded spotters kept a check on recent sightings. They qualify their statistics by the comment that Tojos were more frequent in earlier missions and the Nick sporadic in appearance. Of all fighters sighted, here are the leading "appearances": Tojo, 30 percent; Zeke-Hamp, 19; Oscar, 16; Tony, 13; Nick, 12.

Regardless of type, Jap fighter attacks have been pressed much more closely than on earlier missions. Firing is more general, too. On a recent mission of the Superfortresses, 80 percent of the Jap fighter attacks were closed to 300 yards, and more than 80 percent of the fighters opened

fire. Over a large number of missions, the average had been only about 60 percent. Attacks continue to be largely from the front quarter, for the obvious reason that the Japs have a much faster rate of closure and a minimum deflection in this type of attack. Previous distances for opening fire were concentrated in the 500-1,000 yard range, with many fighters firing at more than 1,000 yards.

Air-to-air bombing is still part of the JAF repertoire. Although the majority of air-to-air missiles have been of the phosphorus-bomb type, crews have reported sighting "frag clusters, demolition types, incendiary clusters, towed bombs constructed to explode on contact, an array of queer, almost indescribable contraptions shaped like orange crates, pieces of pipe, flat oblong boxes, and balls and chains." As in the case of straight fighter attack, the usual air-to-air bombing approach is front-quarter. Jap pilots have shown a tendency to flip their bombs into a formation at close range instead of dropping them from high above the bomber formation.

Jet Formation. P-51 pilots who have encountered the ME262 deep inside Germany report the Nazi jaypee plane excellent at flying formation, diving, and climbing at high altitude. They are not much impressed so far by its performance in a turn or climb at low altitude. A typical formation was described as "a four-flight pattern similar to the AAF's 4-plane fighter formation." Individual aircraft in each flight were arranged with 3 leading line-abreast, and 2 or 3 in trail. The whole formation was "compact."

Correction. Back in the September issue we commented on certain characteristics of the Jap twin-engined bomber known as the "Betty."

In explaining that magnesium is used extensively in the Betty, we made this statement: "Magnesium, however, is a highly inflammable metal which is apt to burst into flames as soon as it is hit." We have since been reminded that magnesium alloy is no more dangerous than any other dural alloy and that its igniting temperature is generally the same as that of aluminum. In correcting our September statement we call your attention to a brief report on magnesium on Page 53 of this issue.

Letter of the Law. Although lecturing enemy civilians on the Geneva Convention is not one of the standard proceedures for American prisoners of war, a B-17 crew member of German descent who had to bail out near Vienna used an abbreviated oration on international law effectively. Parachuting in the vicinity of the Schwechat Heinkel factory, the American came to earth at the post of a civilian guard, who forthwith began flourishing a revolver and demanding, in his loudest Viennese, that the crew member give up. During one of the wilder gestures the American knocked the guard cold. When a few seconds later he was taken into custody by German soldiers, he explained in an accent more Midwestern than Viennese, that civilians had no business threatening soldiers with fire arms. The members of the Wehrmacht agreed, and promised to have the matter "taken up." But the American wasn't satisfied until the guard had come to and been required to listen to the lecture on the rights of the military.

"During one of the wilder gestures the American knocked the guard cold."

They Haven't Given Up. Despite the tremendous number of their planes destroyed in the air and on the ground, despite the fire and explosives spilled on their production centers, the Japanese go on with their program to build—or rebuild—the JAF. More power, better armament, and other technical refinements have been noted often enough to make this determination obvious. Old planes have been improved, new types are being hurried from drawing board to quantity production. Developmental stages that once required four years have been greatly shortened. Since early 1944, monthly production increased notably up to the time of the holocausts of 1945.

"Japan has the choice of watching the destruction of her aircraft industry. . . ."

About two-thirds of Japanese aircraft production comes from two plants, the Nakajima Company and a plant larger than Willow Run, the Mitsubishi Rokuki at Nagoya. The Kawasaki plant and the Kawanishi Company at Kobe-Osaka form a third important center. These tremendous concentrations of industry increased the efficiency and

speed of aireraft produetion in the months before the B-29 attacks and the appearance of the carrier-based planes over Japan. Now concentration means vulnerability. Japan has the choiee of watching the destruction of her aireraft industry, of dispersing the plants or putting the manufaeture underground. The Government has been to great—and very loud—pains to publieize its underground aireraft faeilities. To round out what comfort may remain to the Japanese, it has issued an official memorandum: "Please be at ease. Our war factories have been shifted to other areas." In equally official pronouncements, however, Koiso has admitted tremendous losses.

"Attack by Japanese ground forces was supposed to be synchronized with the jump, but the timing failed."

Meanwhile, the factories have proeeeded with an aeeelerated program. No charaeteristie of the new planes promises greater improvement than the engines. In 1940, the typical Japanese aireraft engine averaged about 1,000 hp on the take-off. Engines now in combat develop about 2,000 hp. The Homare 21, for example, is a two-row, 18-cylinder, air-cooled design developing horsepower equal to that of the P-47.

Inereased power in these new planes may cut range and maneuverability. Altitude may also be limited, but the speed of some of the new models is expeeted to top 400 mph. Safety for airerews has been increased by more effective armor and self-sealing gas tanks. Better guns and occasional additions of 25 mm, 30 mm, 35 mm, and 40 mm eannon have made the Japanese planes a better offensive weapon. All of these advantages may well be eanceled by shortage of able pilots, combat loss, and reduetion of Japanese aireraft industry. But the Japanese have not quit trying.

One Man's Theory. A eraek Luftwaffe pilot has set down his notions of effeetive German fighter tacties against American bomber formations. His main thesis is that fighter eseort should be broken up before attaek on a bomber formation. The result of any bomber attaek, he argues, is not radically redueed by eutting a formation from say 900 to 880. Once fighters are driven off, the bombers come easy. Actual practiee in the Luftwaffe has been to send out fighters at about Gruppe strength. After being veetored to the bomber stream, the fighters make independent or coordinated attaek on either eseort or bomber formation, according to opportunity. Very large attaek-fighter formations with top eover have been generally abandoned. The ehange in tactics has the obvious advantage of eonserving time, fuel, and pilots.

Hirohito's Paratroops. Paratroop operations by the Japanese have not been numerous. Early in the war, Menado in the Celebes, Palembang, Sumatra, and Koepang were all seenes of airborne attaek. Successful operations against Timor, eondueted by the eraek unit No. 1 Teishin-Dan set the seene for one of the most heroie Allied stories of those months, the saga of the Guerrillas of Timor. By these early and generally profitable experiments the Japanese might have been eneouraged to try more and greater paratroop operations in New Guinea. But it was not until late November, 1944, that another sizable operation was attempted. That attaek was planned as part of a counter-offensive to neutralize Morotai. In the midst of planning, it was shifted to support a eonvoy seheduled to enter Ormoe Bay on November 28. The plan fizzled.

A more elaborate airborne attaek was seheduled for December 5-6, designed to assist another eonvoy to unload at Ormoe December 7. Apart from the dramatie aeeent of the date, the main plan was to paralyze Tacoblan and Dulag briefly, and to move in on Buri, San Pablo, and Bayug for systematie occupation. With this attaek, No. 1 Teishin Dan returned to the limelight. But the lights went out, and fast. About 500 paratroops transported by Topsys, with Oscar eseort, went into aetion. Attaek by Japanese ground forees was supposed to be synehronized with the jump, but the timing failed. So did the operation as a whole, thanks in large part to AAF ground units (See "Banzai at Burauen," Air Force for Mareh). To elose the books, the "anniversary eonvoy" was smashed on December 7.

Despite these reeent setbaeks, Japanese plans for airborne organization are ambitious. Besides regular paratroops and airborne infantry, it is believed the Japs have set up paraehute artillery, glider artillery, machine eannon, tank, engineer, signals, transport, and evaeuation units—all airborne. Paratroop training in the Empire began on a large seale in 1940, under the direetion of a hundred Nazi experts imported for the purpose. Between 1941 and 1944 many Japanese were trained in German paratroop schools.

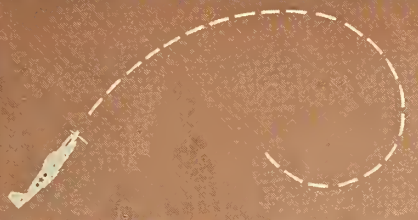
Enemy Charm. Chief German interrogator of all Allied airmen is Oberstleutnant Karl Heinz Jung, head of Dulag Luft at Ober Ursel. Jung specializes in charm, not the flashy variety but the quiet, understanding sort. He ean play every note on the good-fellow theme, from the very-jolly to the serious-professional. His aet has been learned in wide international travels.

Married to a wealthy Peruvian, Jung has lived most of his life outside Germany. He once owned large properties in the United States. His English is better than fluent; he is up on loeal idioms. Acquainted with details of life and customs in all parts of England and the United States, he is an expert at easual conversation on things Allied airmen knew at home. Not the least of his talents is a keen knowledge of aviation, and he is glib at "talking shop." ☆

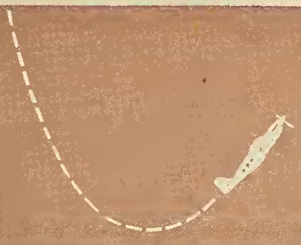
"Jung specializes in charm, not the flashy variety but the quiet, understanding sort."

PIXILATED P-51

Someone in the Wright Field photo lab slipped this Mustang a mickey in order to illustrate aerodynamic effects of violent maneuvers on aircraft. Take it easy on the stick and throttle, don't nose over too quickly or loop too tightly—pity the poor, defenseless plane.



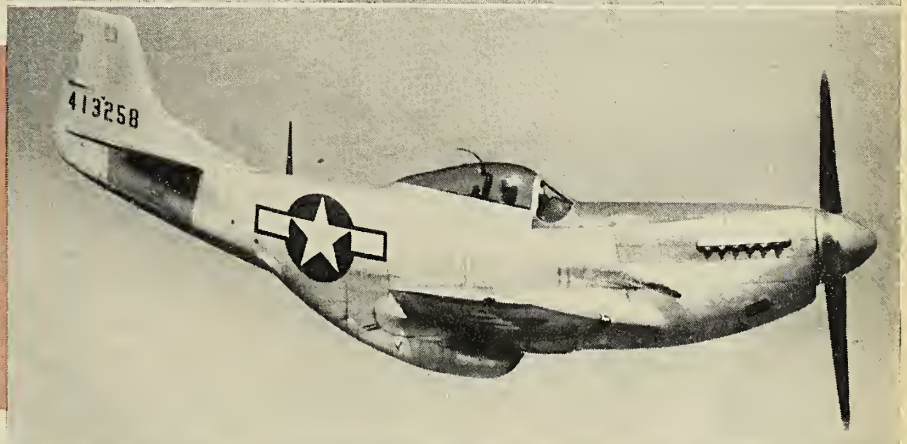
Tight outside loop makes rhubarb out of this Mustang's wings and it now has a slight tendency to succumb to wingtip flapping.

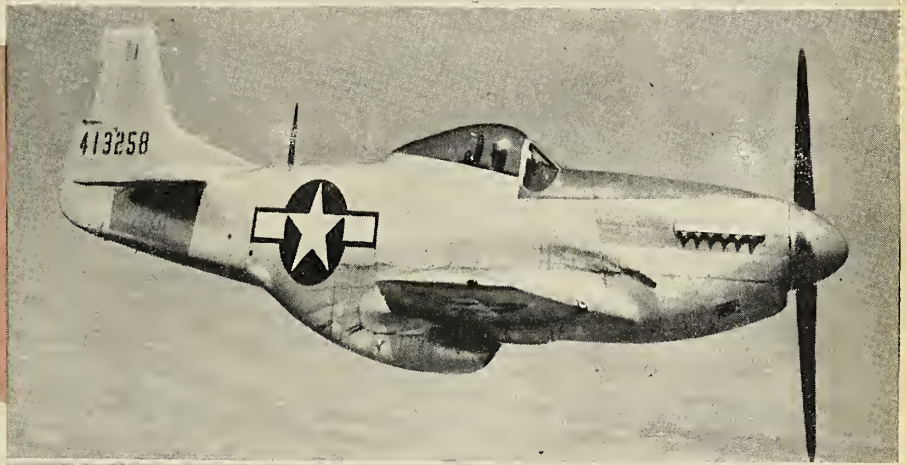


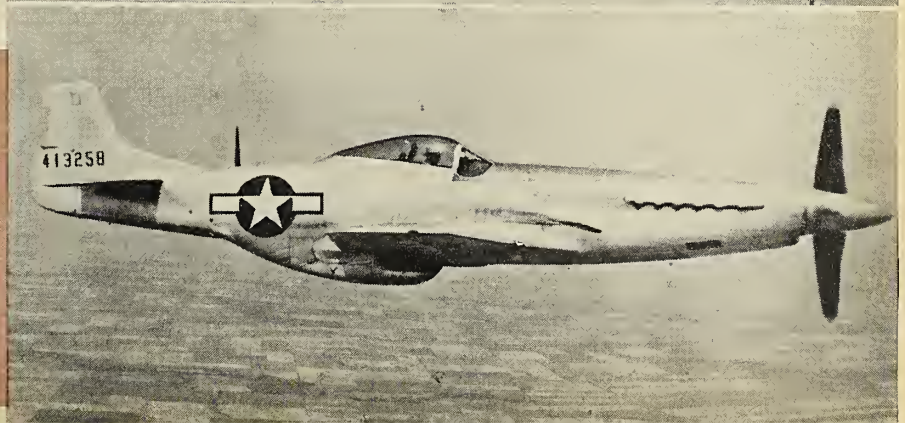
This swayback is the victim of a pilot who yanked back too hard on his stick in a dive pull-out, violently straining his longerons.

Aerodynamicists predict this result if you abruptly cut the throttle and change the prop to low pitch in middle of high-speed run.

Jam on full throttle, throw the prop into high pitch, and your non-elastic P-51 may go out for a nice, long stretch like this.







M/Sgt. Charles W. Woolsey, a Yale graduate, is directly charged with more than 70 projects. He sits among some oversized mock-ups of flight instruments he helped engineer to simplify instruction.

Research from

BY S/SGT. DOUGLAS J. INGELLS

AIR FORCE *Staff*

PHOTOGRAPHS BY T/SGT. CARL GIFFORD

Jim Graham is an enlisted man. He's responsible for installing the first booster pump systems in the fuel tanks of B-17s which lifted their ceilings by at least 10,000 feet. His idea for a new method to cool the Wright R-3350 engine that powers the B-29s turned a good engine into a top performer. In the winter of 1942-43, he was in Alaska helping to lick some of the winterization problems for our aircraft. In 1943-44, he was in India and China looking into the kinks in the performance of the Superforts.

Master Sergeant Graham is one of the many enlisted men assigned to the Engineering Division, Air Technical Service Command, Wright Field. Fifty percent of the new equipment released last year by the Equipment Laboratory resulted from projects handled by these enlisted men. Experimental purchase orders for these GI projects amounted to millions of dollars.

Twenty-five hundred enlisted men are on duty at the Engineering Division, representing the finest pool of professional talent from every walk of civilian and Army life that ever has been gathered together to serve one organization. They range from buck privates to master sergeants, and they have played an important part in the greatest engineering job of all time—to design, develop, and deliver the best possible fighting planes and auxiliary equipment to the men in the AAF.

Down in the laboratories and up in the planes, they do a thousand different tasks that nobody ever hears about. They try and fail, and try again until they succeed. Some have died during grueling tests to prove a new piece of equipment that they helped father into existence. Some have been overseas to witness first-hand the lack of this or that device, and have come back to the States to do something about it. Others have helped perfect new gadgets or weapons and have taken them into combat to make sure they work effectively.

In one laboratory alone there are more than 70 enlisted men engaged in engineering research. Of these, 40 hold engineering degrees — including five masters — from the finest universities in the nation. A former president of a large plastics concern is perfecting a new laminate for all-glass airplanes; an India-born private makes gadgets for the wind tunnels, and scores of other men of all ranks contribute to the job of making the airplane a safer, more efficient fighting weapon. They have a free run to conceive and create, design and develop, predict and perfect.

Consider Master Sergeant Graham, for example. He is no engineer by degree. His knowledge came the hard way —by guess and by feel. But when it comes to engines or fuel systems, his word is accepted. 1st Lt. R. C. Hock, his superior officer, says, "I'd trust Graham's guess sooner than I would my own engineering ability on most things."

Often, the sergeant cannot be found at Wright Field. He's out at Seattle or Wichita or maybe down at Marietta, Ga., ironing out some problem for the men who build the B-29s. When the first YB-29 came out, something went wrong with the brakes; it wouldn't taxi properly. Plant

These AAF enlisted men—engineers, scientists, craftsmen—develop and perfect much that is new in the air

he RANKS

engineers could not find the trouble. They sent for Graham, who soon spotted a busted wheel diaphragm, fixed it, and had the plane rolling.

Graham was the first EM assigned to the 29s in the Spring of 1943. He was crew chief and engineer on the initial test flight of the XB-29 at Seattle and he has been with the big babies ever since. Today he has a total of more than 800 hours in the Superforts.

It was during the service test program that he suggested his idea for cooling the engines. He did it because for 13 consecutive flights the plane in which he was flying had to turn back when the engines quit or got too hot. He suggested that the top cowl flaps—which were flush with the engine cowling—be opened about two inches. The result was a 15 to 20-degree drop in temperature. "It was just enough of an idea," says Graham modestly, "to get the smart engineers to work on it." Final adaptation is an electrically operated flap and new baffling, now part of every B-29 engine.

Then there is Pvt. John Albriton. Aerodynamicists had a problem of developing an instrument for measuring the fluctuations of airflow over an airplane's surface at high speeds. There was an instrument in design stage for 18 months, but nobody seemed able to build the device and make it work.

Albriton set out with tiny tools and a delicate touch and produced the required article that made the instrument work. With a series of discs attached to the surface of a model in a wind tunnel or on a plane in flight, engineers can now obtain a second-by-second record of airflow, whereas previously they had to rely on spasmodic reports. Albriton's nimble fingers also have made the instrument in a miniature version—no larger than a pin head—so that it can be swallowed like a pill to record stomach pressure in a human being.

Whenever manufacturers' representatives and Army men discuss wind tunnel tests and developments, Pvt. Philip Antonatos sits in on the conferences. His word is the "yes" or the "no" on a piece of new test equipment designed for the field's wind tunnels. When a new model comes in for a test he gives it the once over with a slide-rule and microscope to determine whether or not it will withstand high-speed velocities.

One of his devices is a Mach Number meter which makes possible measuring exact mach numbers at high speeds. He also is engaged in designing a new "scavenging system" which takes away jet gases. Applied to the high-altitude wind-tunnel it will permit testing of jet engines.

Other G-Innovations from the design and structural experts include: A force recorder which tells how many pounds of energy are required from a pilot on the control stick to lift a glider off the ground. Two sergeants worked out that gadget and on a similar device which measures the tow-pull force needed to tow a glider. A private is responsible

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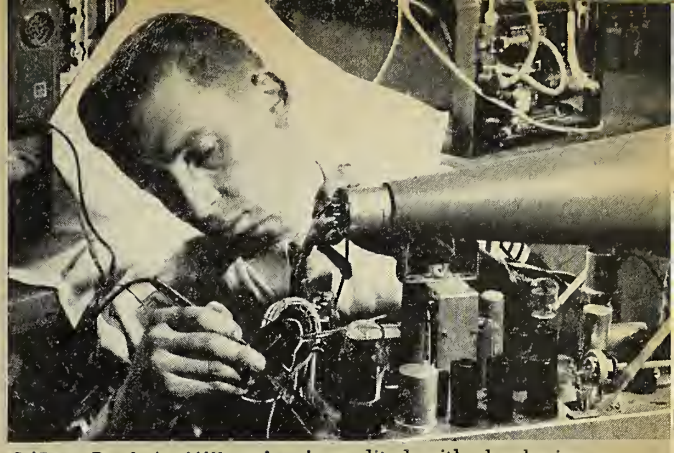
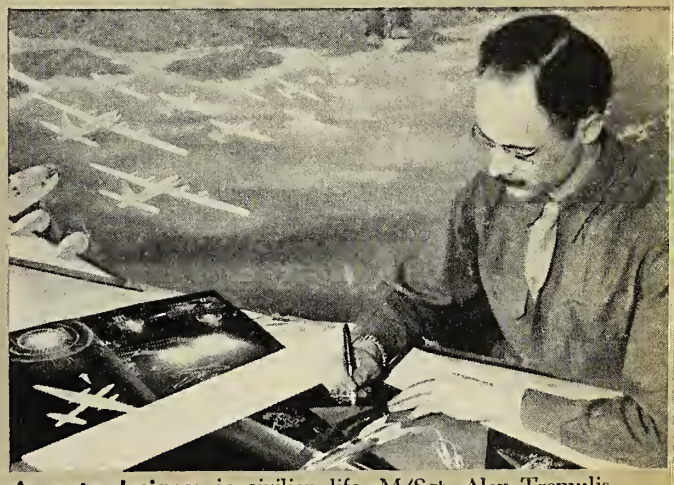


S/Sgt. Paul A. Millerwise is credited with developing a "radar car" for testing various radar devices on the ground.



An auto designer in civilian life, M/Sgt. Alex Tremulis here visualizes an idea for launching fighters by skyrocket.

Inspecting exact-scale model of an air-rescue lifeboat he detailed as asst. project engineer, is S/Sgt. George Brown.

A pioneer in the B-29 program, M/Sgt. Jim Graham points to cowl flaps he worked on to make engines more reliable.

AAF floating aircraft repair units provide emergency maintenance for B-29s in the Pacific

Floaters

The sergeant on Saipan was unhappy. "A B-29 raid on Tokyo is scheduled for tomorrow morning," he said. "We have 50 propeller governor heads to repair. We can't do it, even if we work all night. They'll have to call off the mission."

Capt. Llewellyn N. Duffield, Jr., walked out to the strip. "C'mon," he said. "Each of you guys pick up a governor head and follow me. We're going wading."

He led the men down to the water. A whispered conversation was held with a Navy man, who then started blinking a signal light. "What are you fellows doing," the sergeant inquired, "inviting the Japs to pay us a social visit?" Duffield assured the sergeant that he knew what he was doing and continued his discussion with the Navy signalman. Shortly, a boat pulled up beside them. "In," Duffield grunted. "You, too." He pointed to the sergeant. "In."

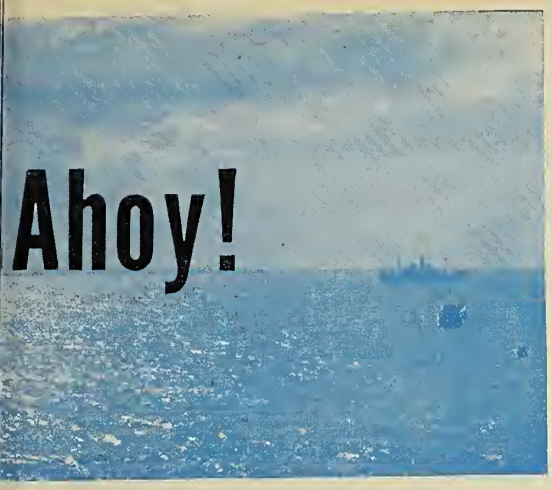
The men rode out to a Liberty ship which was anchored about a mile and a half offshore. After they had scrambled aboard, Duffield explained to the sergeant. "This," he said, "is a floating aircraft repair unit. It has everything necessary for fourth echelon maintenance work. Its job is to move along with our invasions and provide repair facilities for aircraft until an air depot is set up on land. I'm the engineering chief. Right now, we're going to help you out."

The necessary repairs were made by the technicians on the Liberty ship and the governor heads were installed in time for the Tokyo take-off the following morning.

Thus, Saipan was introduced to a sea-borne Air Force installation known officially as an Aircraft Repair Unit (Floating). Actually, it is called a "floater."

The purpose of the floaters is to speed up maintenance operations. Air action cannot wait until complete repair facilities are established. Sometimes it cannot even wait for the men on the floaters to reach shore in small boats and travel the necessary distance to the airfield where repairs are needed. To provide for this, and to speed operations to the highest possible point, a tiny flight deck was installed on the converted Liberty ships that are used for this purpose. Two, and sometimes three, helicopters are standard equipment on all floaters and serve as transportation

Personnel, tools, and spare parts are flown from the Liberty ships to B-29 airfields by R-4B helicopter to speed maintenance and repairs.



Ahoy!

for key personnel, tools and small parts. The floater also carries jeeps, ducks and 30-foot workboats.

Suppose a B-29 remote control turret and computer were damaged by a 20 mm shell. This is what happens:

The engineering officer of the floater flies to the Superfort base by helicopter and inspects the damaged turret to determine the nature of the required repairs. Meanwhile, a jeep with a trailer is brought ashore and driven to the flight strip. The turret is loaded on the jeep, transferred to a small boat, and brought out to the Liberty ship. There, a winch hoists the 435-pound mechanism and lowers it through a hatch into the ship's turret shop.

Once aboard, the turret is dismantled and the damaged parts are assigned to the appropriate repair shops. To the sheet metal, ordnance, welding and electrical shops, respectively, go the turret dome, the .50-caliber machine guns, the gun-supporting cradle and the gun-elevating motor. Weather-stripping is applied by fuel-cell specialists, necessary cadmium plating is done in the electro-plating shop, a magniflux inspection of the elevation trunnion bearing is made in the propeller shop and the gunsight aiming-point camera is checked in the photo section. From plans made in the drafting section, the machine shop men construct a contour-follower crank-arm. Computer vacuum tubes are tested in the radio section, and the computer, itself, in the turret shop.

With tasks thus apportioned, the entire job can be completed within 48 hours.

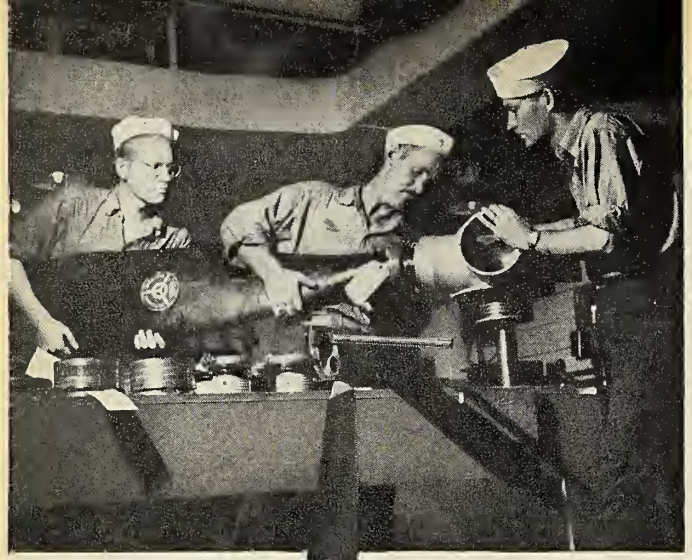
In one actual case, a floater was the principal source of providing breathing oxygen for the aircrews at a B-29 base. On Saipan, captured Japanese oxygen-making machinery turned out 15 cylinders daily, but this was hardly sufficient. A floater relieved the situation by making oxygen on a 24-hour basis for the Superfort base.

Designed to operate under combat conditions, the floaters are protected by twelve 20 mm antiaircraft guns, two 40 mm antiaircraft guns, one 3-inch all purpose gun, and one 5-inch all purpose gun.

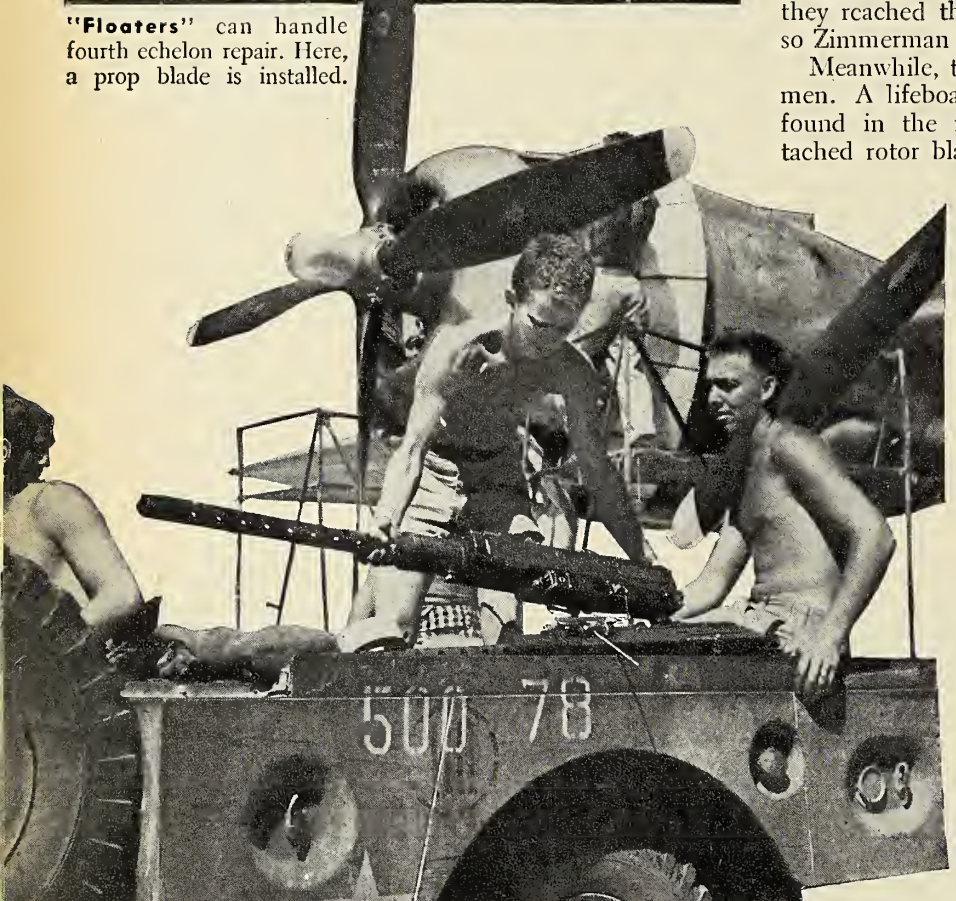
Early in November, 1944, at Saipan, one floater had occasion to use its armament. The Japs attacked the Superfort base in strength. Personnel on the floater watched the battle with great interest. Suddenly, a Jap Betty came off the island, directly at the Liberty ship. The gunners hit it when it was about 700 yards away, and watched it crash into the ocean.

The men on the floaters have had their share of adventure. One of the most dramatic experiences was seen from the deck of the Liberty ship Daniel F. Garrett. During the trip from the States to Saipan, it was the practice of the helicopter pilots to test-hop their planes in order to

All Aircraft Repair Units (Floating) are equipped with at least two helicopters which provide liaison service between ship and shore.

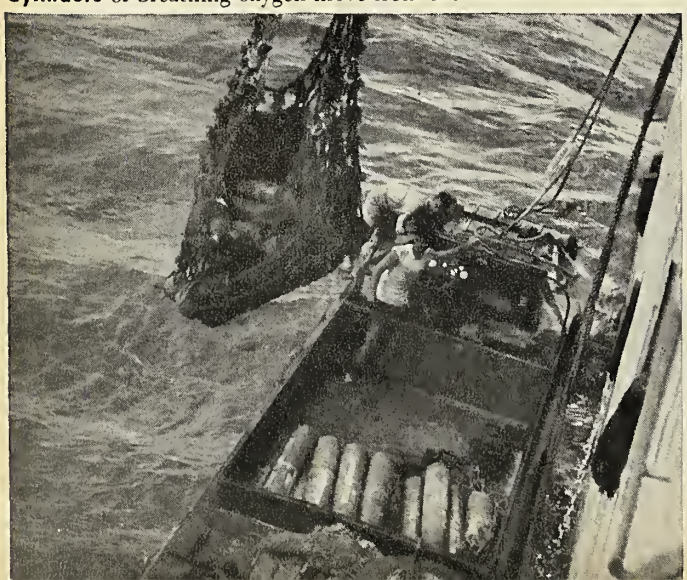


"Floaters" can handle fourth echelon repair. Here, a prop blade is installed.



Machine guns from a B-29 are transferred for cleaning and overhaul.

Cylinders of breathing oxygen move from the "floater" to a "duck."



sharpen up their landing technique. On November 1, 1944, 2nd Lt. Jack L. Zimmerman climbed into his R-4B helicopter with Pvt. William K. Troche as passenger. Troche, assigned to the dope and fabric department, had made some covers for the helicopter, and Zimmerman was taking him up as a reward for his work.

The helicopter took off downwind from its 72-foot by 40-foot deck, got caught in a downdraft about 20 feet off the port side of the ship, and crashed into the ocean. Zimmerman kicked the rudder so that the main rotor hit the water and stopped spinning. Then he said in a very matter-of-fact tone, "Let's get out."

He loosened his safety belt and got into the water. But he couldn't find his passenger. He stuck his head into the helicopter's cockpit, and inquired calmly, "What's the matter?" Troche replied that he was stuck, so Zimmerman unfastened his safety belt, and got him out. But when they reached the top, Troche's Mae West wouldn't work, so Zimmerman held him above the water.

Meanwhile, the ship had gone about a mile past the two men. A lifeboat was launched, but the men could not be found in the rough seas. Crewmen aboard the ship attached rotor blades to the second helicopter and got it off the deck within nine minutes after the alarm had sounded—something of a record. 2nd Lt. Robert Boyce piloted the rescue helicopter and had no difficulty finding the men. He hovered over the spot where they were floundering, and the lifeboat picked them up.

According to Edward Lukas, Sikorsky representative who was aboard, this was the first time that a helicopter had ever gone down at sea. It floated for about five minutes before it sank.

The history of the floaters is uncertain. The idea is said to have originated early in the war in the Mediterranean theater. There, an air depot group commander put his outfit aboard a ship to move it to a forward base. He got the idea that the repair facilities permanently emplaced on shipboard might be useful in a fluid tactical situation. The plan was thrashed out in Tunisian staff meetings, Italian operations offices, and at Washington headquarters. Finally, the Air Technical Service Command, the AAF's engineering, procurement, supply and maintenance agency, got the job of turning the dream into a steel-clad ocean-going reality.

There are about 400 AAF personnel aboard each floater. They wear the blue dungarees and squared white hats of the Navy, and are authorized to wear the shoulder patch of the 20th Air Force. Caught between sea duty and allegiance to the Air Forces, they refer to themselves as "sailjers."

Floating aircraft repair units were organized and specialized training was provided at Bates Field, Ala., the Mobile ATSC Headquarters, Brookley Field, Ala., and the ATSC marine training school, Fairhope, Ala. When AAF personnel first boarded their boats, they didn't know their aft from the forehead, but now they are sea-going veterans.

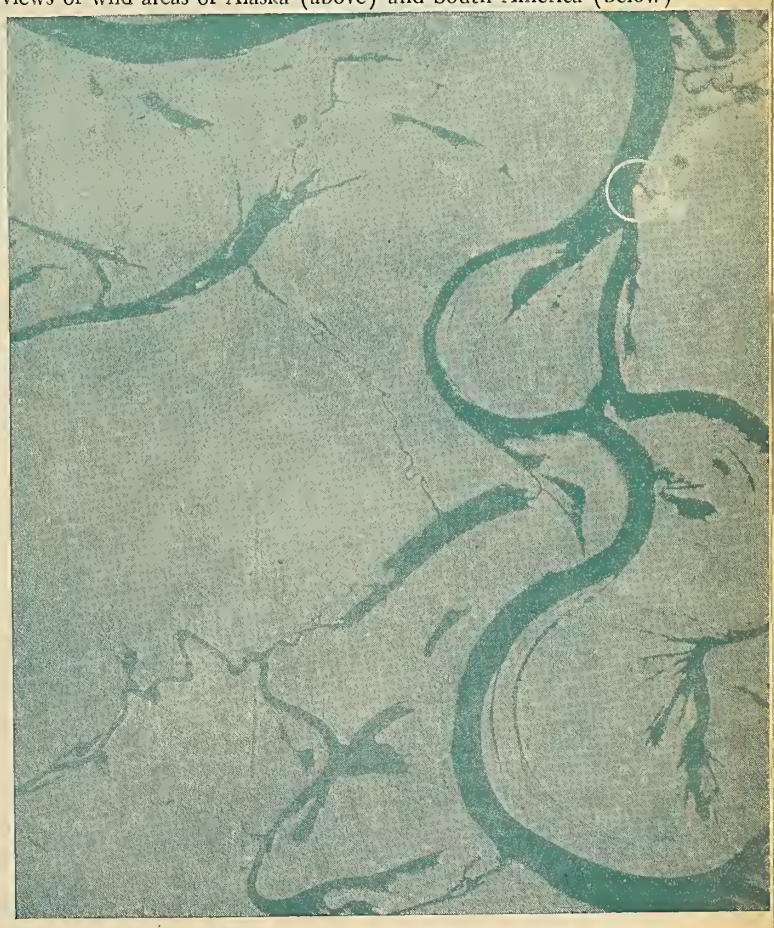
Merchant seamen under the supervision of the Army Transportation Corps actually sail the vessels, and the guns are manned by Army gunners and Naval Armed Guard Service personnel. The floaters are under the direction of the Army Air Forces Pacific Ocean Areas, Maj. Gen. Willis H. Hale, commanding. ☆

They Map the World

Aerial photographers and ground "geodet" parties of the 311th Photo Wing work hand in hand to produce AAF's aeronautical charts

Geodets use an equiangulator to get their longitude and latitude.

Control stations, which compile data used by the AAF in drafting aeronautical charts, are indicated by circled dots in these aerial views of wild areas of Alaska (above) and South America (below)



BY HERBERT RINGOLD
AIR FORCE *Staff*

If you want to know just how global the AAF is, ask the men of the 311th Photographic Wing, whose job it is to gather data and do the aerial photography for the millions of aeronautieal charts needed by our globe-girdling airmen.

They will tell you that the land area of the earth's surfaee comprises 58,000,000 square miles; that only about seven percent of the world had been adequately mapped before the war; that one squadron alone of the 311th is credited with photographing 8,000,000 square miles in less than a year.

If it were only a matter of aerial photography, their job still would be a big one. But it isn't that simple. A series of aerial photographs alone, taken over a large territory, will not produce a map adequate for aerial navigation. Such pictures are distorted in scale, and, before the photographs are worked by the trimetrigon system of compilation and control is established, they lack compass directions, elevation measurements and latitude and longitude grid lines.

To seeure pertinent information, it is necessary to send ground parties to establish a network of control stations at intervals of approximately 50 miles. They determine the latitude and longitude and the approximate elevation of

eaeh station. This data plus the aerial photographs make possible the produetion of the pilotage charts necessary to route our global air traffie over the shortest and safest routes.

Ground work for aeronautical charting is the job of geodetie control parties and one of the many assignments of the 311th Photographie Wing, commanded by Col. Karl L. Polifka.

The "geodets" have operated in Alaska, Canada, Newfoundland, Iceland, Mexico, South America, Africa, India, Arabia and China. Together with their aerial photographic counterparts, they have provided data for aeronautical eharts used on practically every Air Transport Command route in the world. In addition, they have established eheckpoints and provided control for charts of remote areas over whieh the planes of the global 20th Air Foree may have oeeasion to fly.

A geodetie control station may be a house, an unusual rock formation, a bridge, a bend in a river, or anything that ean be identified on the photographs. The establishment of eontrol stations and the aerial photography need not be done at the same time. In China, ground parties did their work first and the photography followed. In parts of South America, aerial reconnaissance preeeded the establishment of eontrol stations. The findings of both groups are coordi-

Ski-fitted liaison plane reached this lonely station at Kiana, Alaska.

nated by the Aeronautieal Charts Service, an AAF organization whieh produees the final charts.

To carry out the aerial part of the mission, "flight strips" are flown. It is like mowing a lawn from 20,000 feet. Aircraft equipped with trimetrigon eameras fly over a strip of land; the three eameras eliek simultaneously about every three miles, and an area 20 miles in width is photographed. Usually, a few planes will "mow the lawn" together; on oeeasion, one plane will do the job, flying parallel, back and forth, until the assignment is eompleted.

The geodets, however, consider the aerial photography phase routine. Their ground parties are the ones who come back with eolorful stories.

Take the ease of Capt. John Meyer, for example. In 1942, he and Sgt. Richard Johnson were assigned to establish eontrol stations in eertain unexplored areas of Alaska. They set out from Fairbanks in a Travelair plane, a single-engine eabin-job equipped with skis. It was piloted by Sam White, an old bush flyer who knew as mueh about that country as anyone.

They went about 100 miles up into the Yukon country and landed on a frozen river. Meyer and Johnson had to jump out of the plane before it stopped and eut green boughs from the trees to put under the plane so that it wouldn't freeze to the iee. The temperature was 55° below zero.

To determine latitude and longitude, an equiangulator is used to observe the stars. When Meyer began his observations, he found that the mercury in the equiangulator had frozen and his equipment was temporarily useless. Furthermore, his eyelids froze to the instrument. He had to wait until the temperature rose.

Early the next night, the temperature went up. But by the time Meyer had arranged his equipment, the stars were obscured by clouds. Determined to get a reading, however, he arose every hour during the night until, at 0400, he finally succeeded.

Some months later, Meyer was working in the 135°-heat of central Afriea. There, he had the unenviable job of flying around in a C-47 and picking landing places where there weren't any.

He was in eommand of a geodetie control party which was establishing stations in the Sudan. In order to spot these stations approximately 50 miles from each other, Captain Meyer and his party had to land in given areas, no matter what the terrain. They just flew along, buzzed a likely looking landing field and came down, for better or worse.

"We spent most of our time worrying," says Meyer. "Would the ground be solid? Would we blow a tire? We were getting into areas where no planes had ever landed before. One day, we put our C-47 down gently and it sank in sand up to its hubcaps. We got another plane from Cairo to bring a jeep which pulled us out."

Geodetie eontrol parties have used almost every mode of transportation known to mankind in order to reach their destinations, including eargo planes, single-engine puddle-jumpers equipped with skis, wheels, and pontoons; coast guard cutters, Eskimo skin-boats, dog teams, eaterpillar tractors, oxearts, trucks of all types, pack mules, yaks, sailboats, ferry boats, paddle-wheel steamers, eamels, eanoes and even sedan ehairs.

A geodetie eontrol party, eomposed of Lt. John Partanen, S/Sgt. Clyde Foushee, Dr. Robert Brown and Floyd Larsen, American missionaries, and Chinese Army eseorts, traveled by yak earavan for 130 days from Kunming, China, to a B-29 airbase some 800 miles away. On their 99th day out, they were eaught in the Chinese equivalent of a Hatfield and McCoy mountain feud and attaeked by bandits. Four bandits were killed, but the Americans eseaped uninjured.

In order to operate on flexible assignments whieh may entail renting or purehasing means of transportation, paying ransom to bandits or winning the friendship of native tribesmen, squadrons of the 311th are often issued large sums of money. Maj. Kenneth Johnson was armed with $80,000 to eomplete a mission in Canada. He aeeounted for all of it and got a 56-eent eredit. Lt. Horaee Harned had $15,000 with him in China when he was held up by bandits who demanded ransom. He put his hand into another pocket, eame up with six eents and the brigands were satisfied. S/Sgt. Paavola also was waylaid by Chinese bandits who wanted 200 Chinese dollars as ransom. He protected Uncle Sam's money by talking the outlaws into aeeepting 40 Chinese dollars—about 50 eents in United States currency.

Men of the 311th have also completed general reconnaissance work for the 11th and 20th Air Forces. The first aerial reconnaissance of Tokyo was made by a B-29 assigned to the 311th Photographie Wing. Operating from Saipan, the plane, piloted by Capt. Ralph D. Steakley, made the 3,370-mile round-trip flight on November 1, 1944. Bomb-damage assessment photographs of attaeked Japanese targets are also part of the wing's work.

Under normal eireumstances, most photographie reconnaissanee is made by specially-equipped P-38s. But when

(*Continued on Page 60*)

for service . . .

Fruit salad is on the menu, but check your authority for wearing theater ribbons, service ribbons and battle stars

ILLUSTRATED BY CPL. MILTON J. WYNNE

The scope, duration and multiple operations of the current war have resulted in the creation of a greater number of service awards for United States military personnel than were authorized in any previous conflict in the nation's history.

Vari-colored ribbons, gold cloth bars and miniature bronze and silver service stars and bronze arrowheads have been established during the past three and one-half years to denote where, when and how long an individual has served and to indicate the campaigns, battles or engagements in which he has participated.

These insignia, plus the earlier-authorized stripe or "hash mark" signifying three years' active federal service by an enlisted man, may be seen on the back cover of this issue of AIR FORCE.

There are three ribbons for service in theaters of operations—one for the European-African-Middle Eastern theater, one for the Asiatic-Pacific theater and one for the American theater for service outside the U. S. continental limits. In addition, there is a ribbon for those who began active federal service during the prewar emergency period, and two others for action in the defense or liberation of the Philippines. Ribbons are worn above the left breast pocket.

Participating as a member of a unit in a combat operation, considered by either the War Department or a theater commander to be of major importance, or fulfilling more than one optional requirement for certain ribbons, entitles a man to a bronze service star to be affixed to the appropriate ribbon. A silver service star is worn in lieu of five bronze service stars.

The newest service insigne is the bronze arrowhead, also attached to the pertinent ribbon. It may be gained by landing by parachute or glider in enemy-held territory as an assigned or attached member of an organization carrying out a tactical mission, or by taking part in an initial assault landing on a hostile shore.

Each of the gold cloth bars, worn on the lower left sleeve above the service stripe or stripes, represents six full months' service, not necessarily continuous, outside the continental limits of the United States. Time involved is figured from date of departure from the United States to date of return.

Eligibility requirements for the theater ribbons have been changed from time to time as the war has progressed. Following is a digest based on regulations and general orders covering the subject of service awards.

The **European-African-Middle Eastern Theater** ribbon or the **Asiatic-Pacific Theater** ribbon is worn by personnel who have served in an applicable area under permanent orders for any period since December 7, 1941, but qualifications for those under temporary orders have twice been amended. From December 7, 1941 to July 12, 1943, temporary duty, regardless of length, was sufficient. Since July 13, 1943, a person can establish eligibility by being awarded a decoration for combat in the theater, or by serving more than 30 consecutive days in the theater, or, since November 23, 1943, by serving a total of 60 non-consecutive days in the theater.

The **American Theater** ribbon was authorized for personnel who have served in the pertinent region, outside the United States. Requirements have varied as follows:

1. Service under official orders for any length of time, except when passing through the area en route to another theater of operations, from December 7, 1941 to March 7, 1943.
2. Service under official orders for any length of time, provided the individual concerned was not in the theater merely as a passenger en route to another theater or on a training flight, trip or voyage or on maneuvers, from March 8, 1943 to July 12, 1943.
3. Arrival under permanent orders at a place of duty in the theater, or 30 days' consecutive service while assigned permanently to duty as a member of a crew of a vessel sailing ocean waters in the area or as a member of the

operating crew of an airplane making regular and frequent trips over ocean waters in the area, since July 13, 1943. (A ground assignment in the United States in a squadron, whose personnel made such flights, is not sufficient for eligibility.)

4. Temporary duty of more than 30 consecutive days or a total of 60 non-consecutive days in the theater since November 23, 1943.

The **American Defense** ribbon may be worn by those who entered active federal service between September 8, 1939 and December 7, 1941, for a period of not less than 12 months. An individual who served outside the United States at any time during that period may affix a bronze service star to his ribbon.

Theater of Operations and American Defense medals have been authorized, but they will not be manufactured until after the war's conclusion.

Eligible to wear the **Philippines Defense** ribbon are those who fulfilled one of the following conditions:

1. Service under enemy fire in or over Philippine territory or waters, from December 8, 1941 to June 15, 1942.
2. Duty in Philippine territory or waters for 30 days between December 8, 1941 and June 15, 1942.

The **Philippines Liberation** ribbon is authorized for personnel who meet one of the following conditions:

1. Participation in the initial landing operations on Leyte and adjoining islands from October 17, 1944 to October 20, 1944, or presence on a ship in Philippine waters or service as a crew member of an airplane which flew over Philippine territory, from October 17, 1944 to October 20, 1944.
2. Service under enemy fire at any time during the campaign.
3. Service in the Philippines or on ships in Philippine waters for 30 days from October 17, 1944 to a date to be announced later.

Relative to the last two listed ribbons, Philippine waters are defined as those within 50 miles of any of the islands comprising the Philippines. A person meeting two of the provisions for either ribbon is entitled to wear a bronze star on his ribbon. One who meets all three provisions for the Philippines Liberation ribbon is entitled to wear two such stars.

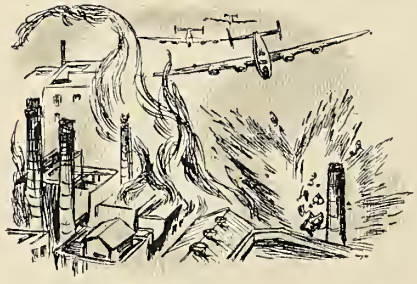
Although authority for wearing

most of the stars for campaigns, battles and engagements is contained in War Department regulations and circulars, others may be authorized by a theater commander if he believes a battle within a campaign or an engagement within a battle is worthy of such recognition.

In the fall of 1943, for instance, the air war over Europe was officially designated "Air Offensive, Europe," and the War Department authorized participating personnel to wear a star on their European-African-Middle Eastern Theater ribbons. Yet the theater commander decided that the Ploesti air attack of August 1, 1943 was important enough to be classed as a major battle in itself, and he authorized those who flew on that mission to wear a battle star for that duty alone. If they participated in other missions as part of "Air Offensive, Europe," they became eligible to wear another star.

Operations which had been designated, up to March 14, 1945, in War Department general orders as campaigns, battles or engagements entitling participants to wear a bronze star on the appropriate ribbon, follow, with respective combat zones and time limitations:

AIR OFFENSIVE, EUROPE—European Theater of Operations, excluding



the land areas of the United Kingdom and Iceland, from July 4, 1942 to June 5, 1944.

AIR OFFENSIVE, JAPAN — Hokkaido, Honshu, Shikoku, Kyushu, the enemy-owned portion of Karufuto, and the Kurile, Bonin and Ryukyu islands, including the immediately adjacent waters, from April 17, 1942 to a date to be announced later.

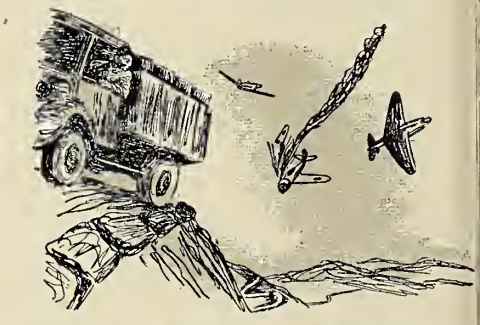
ALEUTIAN ISLANDS—Area bounded by 165° west and 170° east longitude and by 50° and 55° north latitude, from June 3, 1942 to August 24, 1943.

ALGERIA-FRENCH MOROCCO—Algeria, French Morocco and adjacent waters, from November 8, 1942 to November 11, 1942.

ANTI-SUBMARINE (for operations not incidental to a designated campaign or battle for which the unit receives credit otherwise) — All theaters of operations and defense commands, from December 7, 1941 to a date to be announced later.

BISMARCK ARCHIPELAGO — Bismarck Archipelago and adjacent waters, from December 15, 1943 to November 27, 1944.*

BURMA, 1942—Burma, from Decem-



ber 7, 1941 to May 26, 1942.

CENTRAL PACIFIC — The Gilbert Islands, Nauru and the portion of the Central Pacific area lying west of the 180th meridian, from December 7, 1941 to December 6, 1943; the Hawaiian Islands, December 7, 1941, only, and Midway Island, from June 3, 1942 to June 6, 1942.

CHINA—Enemy-held portions of China and contiguous countries, plus a zone 50 miles wide extending into territory held by Allied forces, from July 4, 1942 to a date to be announced later.

EAST INDIES—The Southwest Pacific area, excluding the Philippine Islands and the portion of Australia south of 21° south latitude, from January 1, 1942 to July 22, 1942.

EGYPT-LIBYA—Portions of Egypt and Libya and adjacent waters, west of 30° east longitude, from June 11, 1942 to November 6, 1942, and west of 25° east longitude, from November 7, 1942 to February 12, 1943.

GUADALCANAL—Solomon Islands, Bismarck Archipelago and adjacent waters, from August 7, 1942 to February 21, 1943.

GERMANY—Portions of France, Belgium, the Netherlands, Luxembourg and Germany, east of a line extending from the North Sea along the Franco-Belgian border to 4° east longitude, thence south along that meridian to 47° latitude, thence east along that parallel to 5° east longitude and thence south along that meridian to the Mediterranean coast, from September 15, 1944 to a date to be announced.

INDIA-BURMA — Portions of India, Burma, enemy-held territory and adjacent waters, beyond a line extending from the Assam-Thibet border at 95° 45′ east longitude, due south to 27° 32′ north latitude, thence due west to the Sadiya branch of the Sadiya-Dibrugarh Railway (exclusive), thence southwest along the railway to Tinsukia (exclusive), thence south along the Bengal and Assam Railway to Namrup (exclusive), and thence southwestward through Mokeuchung, Kohima, Imphal and Aijal to Chittagong (all-inclusive), from

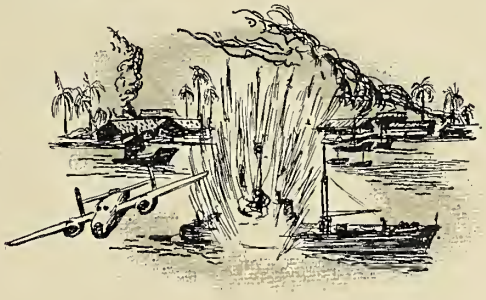
April 2, 1942 to a date to be announced later.

MANDATED ISLANDS—The portion of the Central Pacific area west of the 180th meridian, excluding the Gilbert Islands, from December 7, 1943 for air operations and from January 31, 1944 for ground operations, to a date to be announced later.

NAPLES-FOGGIA—Italy (excluding Sicily and Sardinia), Corsica and adjacent waters, from August 18, 1943 for air operations and from September 9, 1943 for ground operations, to a date to be announced.

NEW GUINEA — 1 — The Southwest Pacific area, excluding the Philippines and the portion of Australia south of 21° south latitude and east of 140° east longitude, from January 24, 1943 to December 14, 1943.

2—The Southwest Pacific area, excluding the Philippines, the above-described portion of Australia, the Bismarck Archipelago and the latter's adjacent waters, from December 15, 1943 to September 30, 1944.



3—The Southwest Pacific area, excluding the Philippines, all of Australia, the Bismarck Archipelago and its adjacent waters and the portion of New Guinea south and east of Madang, from October 1, 1944 to December 31, 1944.*

NORMANDY — European Theater of Operations, excluding the land areas of the United Kingdom and Iceland, from June 6, 1944 to a date to be announced later.

NORTHERN FRANCE—European Theater of Operations, excluding the land areas of the United Kingdom and Iceland, from July 25, 1944 to September 14, 1944.*

NORTHERN SOLOMONS—1—Solomon Islands north and west of Russell Islands, the Bismarck Archipelago and adjacent waters, from February 22, 1943 to December 14, 1943.

2—Solomon Islands, north and west of Russell Islands, and adjacent waters, from December 15, 1943 to September 30, 1944.

3—Bougainville Island and adjacent waters, from October 1, 1944 to November 31, 1944.*

PAPUA—The Southwest Pacific area, excluding the Philippines and the portion of Australia south of 21° south latitude and east of 140° east longitude, from July 23, 1942 to January 23, 1943.

PHILIPPINE ISLANDS — Philippine Islands and waters within 50 miles, from December 7, 1941 to May 10, 1942.

PHILIPPINE LIBERATION—Philippine Islands and adjacent waters, from October 17, 1944 to a date to be announced later.

ROME-ARNO—1—Italy (excluding Sicily and Sardinia), Corsica and adjacent waters, from January 22, 1944 to August 15, 1944.

2—The portion of the Italian mainland north of 42° north latitude and adjacent waters, from August 16, 1944 to a date to be announced later.

SICILY—Sicily and adjacent waters, from May 14, 1943 to August 17, 1943, for air operations, and from July 9, 1943 to August 17, 1943, for ground operations.

SOUTHERN FRANCE — Portions of France (excluding Corsica), occupied by forces assigned to the North African Theater of Operations, from August 15, 1944 to September 14, 1944. (Waters adjacent to the described portions of France are included.)

TUNISIA—Portions of Tunisia and Algeria, east of a line extending from north to south through Constantine, and adjacent waters, from November 8, 1942 to May 13, 1943, for air operations, and from November 17, 1943 to May 13, 1943, for ground operations.

*—Theater commander may award stars to individuals who actually engaged the enemy after the final date listed.

Before a man leaves a theater of operations he should make certain that his eligibility to an award or awards is noted in his service record. On this or any other matters concerning service awards, he should consult his squadron adjutant. ☆

RHINELAND RENDEZVOUS

(Continued from Page 6)

chine gun fire subsided somewhat and I heard somebody approaching from the rear. While I was debating whether to emerge and surrender, someone shouted in English. I crawled out from behind the planks yelling "Thunder" as loudly as I could. This was the pass word up to 1200. For good measure, I threw in "Hither," the pass word for the afternoon. Two British paratroopers peered cautiously around the side of the shed. They motioned for me to come out of the door and they kept me covered with their tommy guns while I told them how I got here.

The two troopers took me over to their sergeant who appeared satisfied I wasn't a German. He told me his squad was preparing to capture the railroad station of the village of Hamminkeln. The station was about 200 yards up the track.

"You can come along with us," he said. One of his troopers gave me a German pistol and a pocketful of ammunition. "Here you are, mate," he said. "You may need them."

Single file we wormed our way up the tracks, keeping close to a string of freight cars, ducking behind the steel wheels whenever somebody let go at us from the wood. We reached the station without firing a shot. A quick search of the cellar flushed out a dozen German soldiers. A farm house across the road was demolished. One of the Germans said a glider had crashed into it. A number of bodies were lying in the farmyard and a little farther down the road a dead British pilot lay sprawled in the wreckage of his fighter plane.

In a few minutes, other squads of British paratroops closed in from various directions and by 1100 the station had been converted into a battalion command post. Among the arrivals was S/Sgt. Raymond Hill, the radio operator of our airplane. He had landed close by the Issel Canal and was immediately taken prisoner by a German who had watched him coming down. As they were about to march off, a burst of machine gun fire dropped the German with a bullet through his shoulder. The German thereupon surrendered to Hill. They started off in another direction, but they had taken only a few steps when a burst of fire raked the area. The wounded German didn't duck quickly enough. When Hill left him a few minutes later he was dead.

Shortly after 1200, the Liberators came winging over the battle area, just above the tree tops, dropping bundles of ammunition and equipment. By this time many of the flak guns either had been silenced by our fighters or captured by the paratroops. A few, however, were still blazing away and we saw one B-24 sink behind the trees, its engines blazing. Later we learned that nine of these resupply planes were lost to enemy action.

At about 1300, patrols reported several German tanks and a number of half-tracks were massing for a counterattack against the railroad station. Since the battalion had nothing in the way of heavy guns, the commander put in a hurried radio call for help. Within 10 minutes a formation of our rocket-carrying fighters came in and worked on the German armor. That was the end of the counterattack.

Late in the afternoon, Hill and I made our way to the division command post. The American and British paratroopers had consolidated their positions. Before nightfall, contact was established with the forces that had crossed the Rhine prior to the airborne landings.

The next morning, S/Sgt. Galen Boltjes, our crew chief, turned up. He had landed in the middle of a field that was under fire from both sides.

"I buried my nose in furrows and stayed there all afternoon and night," he related. "Every time I lifted my head someone took a shot at me."

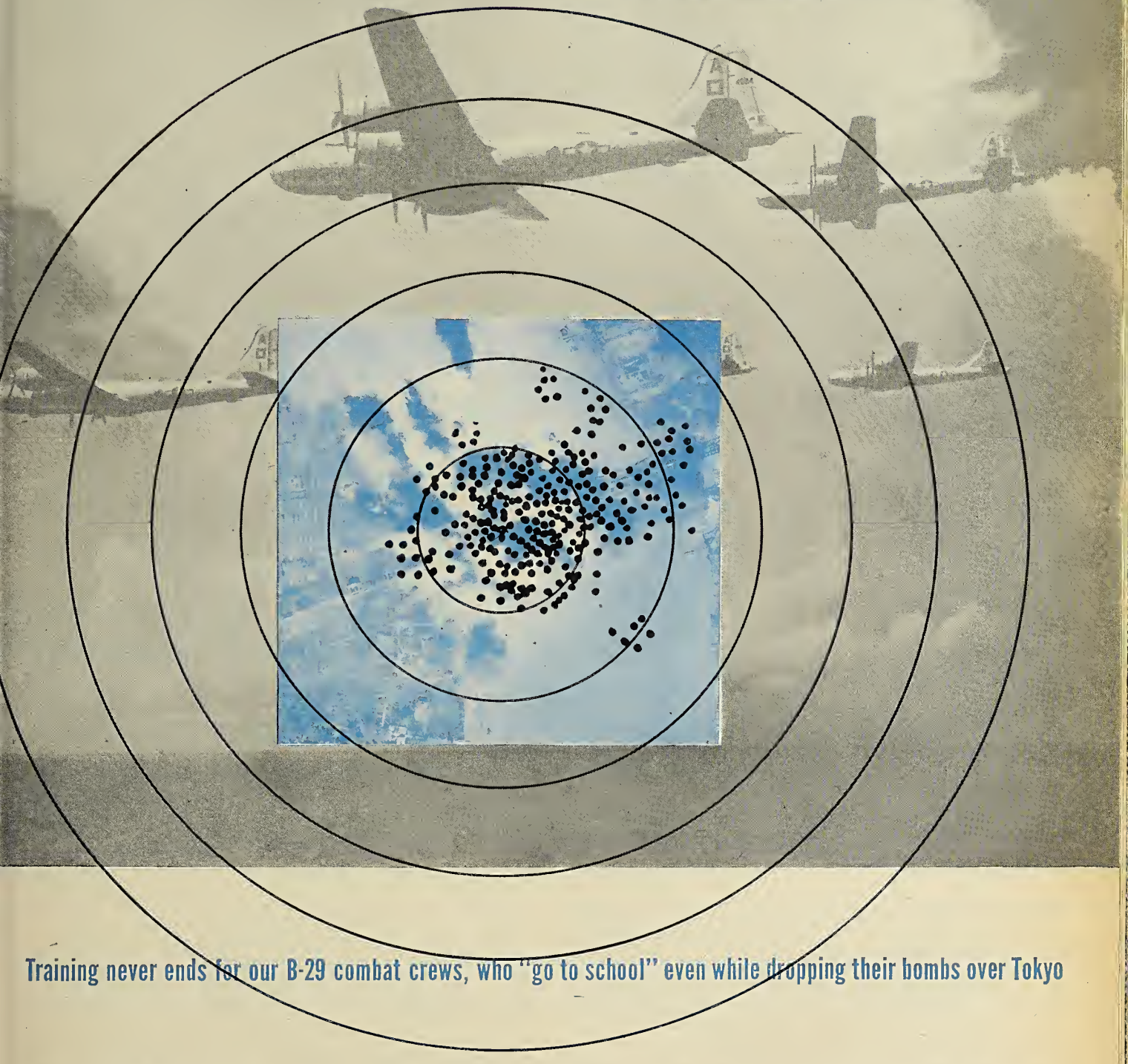
Galen, Hill and I moved on to the American Division Headquarters located in a forest nearer the Rhine. There we met Bud Hutton, correspondent for STARS AND STRIPES, who told us half the paratroopers from our plane had been killed. Some were shot as they floated down in their parachutes, others died in an assault against a German regi-

(Continued on Page 58)

H-hour breaks and paratroopers shower into the Rees-Wesel area. Sgt. F. Quandt took this photo from B-17 shown on Page 58.

PRACTICE MAKES PERFECT

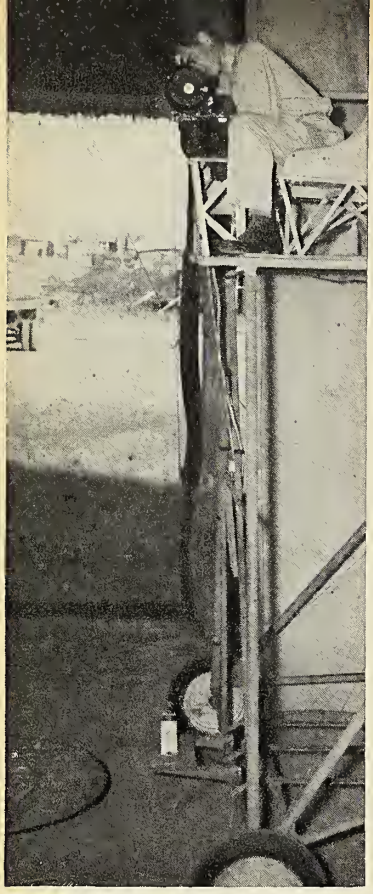
BY CAPT. LAWRENCE P. BACHMANN
AIR FORCE Overseas Staff



Training never ends for our B-29 combat crews, who "go to school" even while dropping their bombs over Tokyo

Precision gained by 20th Air Force bombardiers through intensive training is seen in the above illustration, composed of bomb plot and photo made during attack on the Rama VI Bridge at Bangkok. Superforts cripple enemy communications as well as war industry.

IF potential B-29 crewmen think their training will have been completed when they begin to fly combat missions, they have another guess coming. Their transition instruction by the Training Command, combat crew training by the 2nd Air Force and replacement crew indoctrination by the overseas command to which they're assigned represent only the beginning of a course which won't be concluded until the airmen are returned to the United States for reassignment or discharge. Maj. Gen. Curtis E. LeMay and Brig. Gen. Roger M. Ramey, respective commanders of the 21st and 20th Bomber Commands, are strong in their belief



Model of Yawata (on floor) is used with A2 Trainer to drill bombardier for attack on that important target.

that a bombardment outfit's effectiveness is directly proportional to the amount of training it undergoes. If they can help it, no misfit will mar the operational smoothness for which the 20th Air Force is noted. And they are helping it. For they're well aware that one man's ineptitude may ruin a mission, perhaps bring death to an entire crew.

This continuous combat training, which originated under General LeMay when he headed the 20th Bomber Command in India, proved so successful that it was adopted by the 21st Bomber Command in the Marianas. It has paid off richly in dividends, in the mounting devastation that is being rained on industrial Japan by our Superforts.

Nothing is taken for granted when a new B-29 crew arrives in a theater of operations. The competency of each individual must be proved before he is assigned to replacement crew training. By interviews and tests, the group operations officer and group specialists determine just how well each crew member knows the fundamentals of his job.

It can be said to the credit of the Training Command and the 2nd Air Force that nearly all their B-29 graduates are more than adequately prepared to pass the 20th Air Force's preliminary tests without difficulty.

Naturally, however, a few crewmen arrive overseas with deficiencies which must be corrected before they can qualify for replacement crew training, even if such action necessitates grounding a man or an entire crew indefinitely.

Shortcomings of this below-par group usually run pretty much to a standard pattern. There are pilots who are able flyers but weak commanders; bombardiers who are insufficient in their role of key man in the operation of the Remote Control Turret system; navigators who need additional instruction in celestial and long range navigation, the proper method of keeping a log and the use and maintenance of the gyro fluxgate compass; engineers who have not learned to cooperate fully with their pilots, and gunners who are short on teamwork or who are unable to use the K20 camera efficiently.

Replacement crew training, which indoctrinates new crews in the tactics and policies of the combat command, is given at group level.

A training officer, who supervises the ground school, and the assistant group operations officer, who is in charge of flying instruction, are aided in conducting the replacement training program by group specialists and members of the lead crews.

In the ground school, pilots and copilots receive 10 hours of instruction in flight engineering, a minimum of five hours in communications, four hours in emergency procedures and several hours in each of weather, landing and general procedures.

For the bombardier, the curriculum prescribes intensive study of the Remote Control Turret system until its operation is mastered, 10 hours in target identification, a minimum of two hours weekly in the A5 Bomb Trainer and camera practice until proficiency is attained.

Navigators are taught theater navigation aids until they know them thoroughly, and they receive two hours in each of weather, terrain, tactical missions and "over the Hump" communications and an hour in general procedures such as direction finding, air-ground communications and air-to-air homing. In addition, they are given supervised review in front gunner's duties, photography and the gyro fluxgate compass.

Following 10 hours' work in standing operating procedures, the flight engineers study factors affecting output, efficiency and endurance of B-29 engines, cruise control, aircraft performance, weight and balance and emergency procedures.

Gunners are given as much instruction as they individually require in aircraft and surface craft identification, two hours in standing operating procedures, two hours in scanning, tracking and firing and an hour in enemy tactics. They are also checked in the maintenance and use of their guns and the Remote Control Turret system and in the correction of malfunctions.

The schedule for radio operators includes two hours in "over the Hump" missions, two hours in tactical missions and an hour in general procedures.

Upon completion of ground school, the new crew enters the air phase of the replacement training program. During this period, which lasts from one to two weeks, the crew flies practice missions in formation while group specialists observe the progress of each individual. The pilot, meanwhile, is also checked out in instrument flying, and he rides as an observer on a combat mission with an experienced crew.

The climax of replacement crew training comes with a long-range mission. If that is accomplished satisfactorily, the new crew is considered ready to play its part in carrying the war to the enemy homeland.

But, as it was pointed out earlier, assignment to combat duty does not mark the conclusion of training. It merely means eligibility to begin general crew training in which every man on flying duty in the 20th Air Force participates.

Between combat missions, a rigorous course of instruction and practice is pursued. The missions themselves are considered part of the training program, for lessons learned in battle are the most valuable, and the lengthy critiques which follow every attack on the enemy are especially helpful. Mistakes are pointed out and discussed, and corrective measures are recommended so that the errors will not be repeated.

For the most part, general crew training is a refinement of replacement crew training. The airmen are drilled again and again in procedures and tactics until their work becomes second nature to them and they are able to meet any possible situation without hesitation.

Ground schooling is alternated with flying. Thus theory learned in the classroom is applied in the air. To effect this arrangement, each squadron is divided into A and B flights.

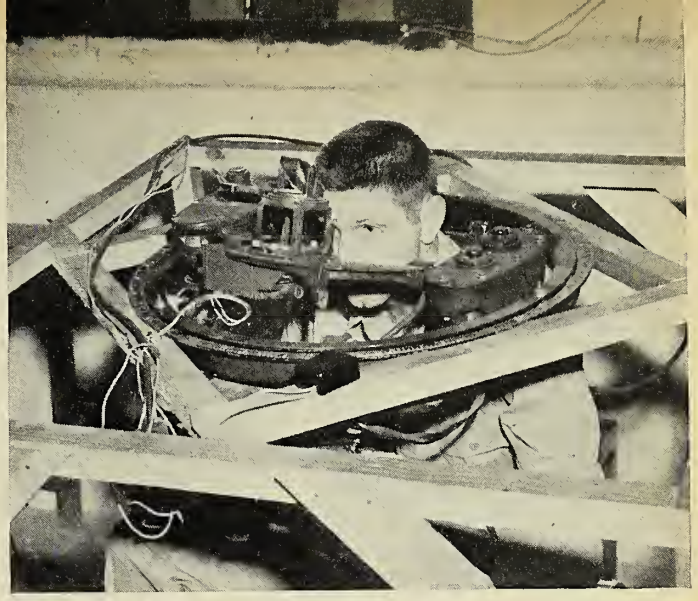
While one flies on combat or practice missions, the other attends school at the base. The progress of each individual is recorded on charts posted by the training officer.

In classroom and in the air, emphasis is placed upon teamwork. By studying together constantly, crewmen whose duties are interrelated become familiar with each others' problems and discover how complete cooperation can best be achieved.

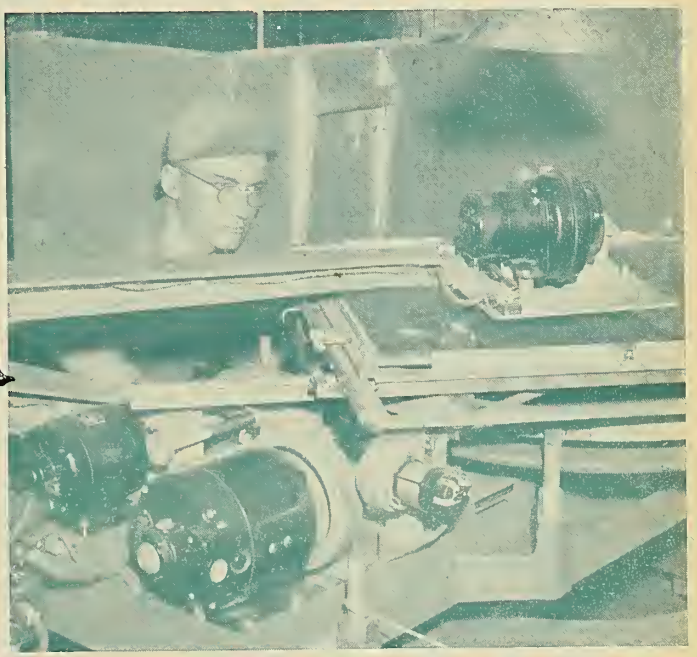
Synthetic training devices have proved of great value in ground school. By use of the A5 and A2 bomb trainers with models and photographs of targets slated to be struck later in combat, bombardiers can practice every possible approach as well as offset or checkpoint bombing. Other training devices help the gunners to retain their sharpness.

Training missions, which are flown in formation, are usually of five hours duration so that every crewman can gain ample practice in his specialty. On the way to the dummy targets, the B-29s are "attacked" by AAF fighter planes and hits scored by the Superfort gunners are recorded by camera. Following the bombing runs, the men are drilled in emergency procedures.

Since lead crews have the greatest responsibility in combat, they work hardest of all in the training program. The practice schedule of other crews hinges upon the availability of planes for that purpose, but lead crews fly every second day either on combat or training missions. ☆

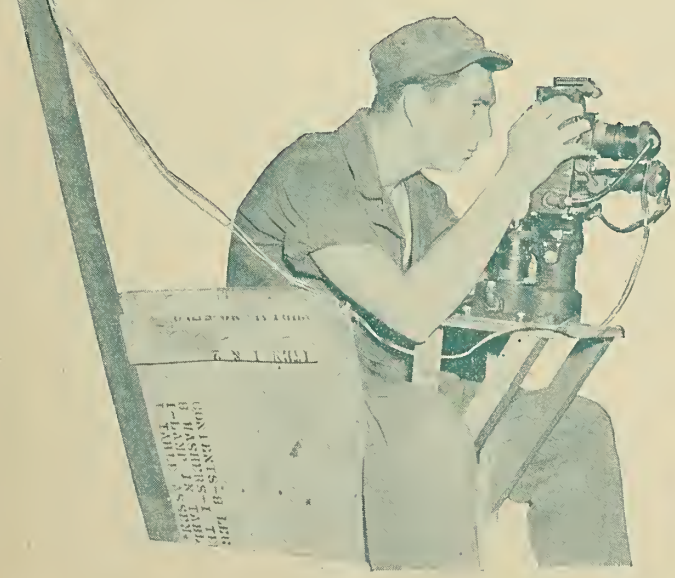


Mock-up of B-29 upper turret sighting station at overseas ground school of the 20th Air Force enables gunner to sharpen his eye.



Recon photo of potential target is projected by this unit of the A5 Bombardier Trainer on a horizontal screen beneath bombsight

Frequent practice with this mock-up of a B-29 blister sighting station keeps a gunner at peak of efficiency.



Flight engineers view a training film as part of the continuous course of instruction given B-29 crews in theaters of operations.

Statue of Kaiserin Augusta on Kaiser Wilhelm-Ring, Cologne.

An AAF bulldozer disposes of a JU88 from an advanced airfield.

this was COLOGNE

PHOTOS BY T/SGT. ROGER COSTER

AIR FORCE *Staff Photographer*

The devastating effects of all-out war on a modern industrial city were seen at ground-level for the first time when Allied observers moved into Cologne in the wake of the ground forces early in March. A by-word for Allied striking power since May 1942, when the RAF chose it as the target for its first 1,000 plane raid, Cologne took a place on the AAF Hit Parade in February 1944. Since then it has become one of the 10 European cities most heavily bombed by the AAF, absorbing a total of 12,418 tons. Of these, nearly 8,000 were dropped in the three days of October 14, 15 and 17. The total for all Allied air forces were 42,000 tons.

Residents of Cologne attest that it was these October attacks (swelled by the RAF night effort) which finally immobilized the public utilities of Cologne, made restoration of transport a hopeless task, virtually ended its industrial contribution to the German war effort. Preliminary assessment was that 60% of the industrial and built-up area of Cologne had been leveled, though the famous cathedral escaped a direct hit. The pre-war population of 720,000 had dwindled to 100,000.

Mass of rubble is all that remains of a Cologne residential area.

Cathedral looks down on the ruins of Germany's fourth city.

Two vehicles can scarcely pass on this bomb-gutted thoroughfare.

With a blasted tank beside it and a sign warning sightseers not to approach closer, the Cathedral maintains its watch on the no longer sacred Rhine. Scarred by blast, it escaped a direct hit by any of the 42,000 tons of bombs dropped by Allied flyers.

(Continued from Page 13)

sergeant to fly in anything less than perfect physical condition. He can remind him that the plane might have been lost to flak, or to fighters coming in head-on. He can insist that the chances of failure on the part of the substitute gunner were practically nil. He can bolster the sergeant's shaky ego by praising him for acting according to regulations. In these cases, a thorough ventilation of the subject is usually enough to put the patient back on his feet.

Lt. Y is a fighter pilot, a fairly strong personality who did not get on very well with his squadron mates overseas and who is now troubled by a frightening and recurring dream. He dreams that he is trying to swallow something too large for his throat, that it will not go down. It chokes him, and he wakes up coughing and disturbed.

Discussion of the lieutenant's experiences overseas reveals that on his fifth or sixth mission his plane was shot up, he landed without brakes, ran off the end of the runway into a crowd of spectators and killed one of them. An investigating board reported that the accident was 50% attributable to pilot error, 50% to mechanical failure. Lt. Y did not agree with this verdict; he felt that nobody could have prevented the accident. He felt, furthermore, that from that moment he was under a cloud, that his chances for promotion were lost, that his flying mates no longer respected him. He finished his tour, but he was far from happy, and when he came home he began to be troubled by this dream.

The psychiatrist points out, to begin with, that the dream is simply a pictorialization of his inability to 'swallow' the decision that he considered so unfair. It is still 'stuck in his craw'. (Admittedly, few dreams are as 'pat' as this one, but the case is by no means impossible.) The lieutenant is told that he should stop worrying about the past, that he has an important future ahead of him. The psychiatrist may remark mildly that no one is infallible, that quite possibly the investigating board was wrong. In any case, no one is holding the accident against the lieutenant now. He ought to see his problem for what it is, examine it in the light of day, so to speak, and put it in its proper perspective. As soon as he does, in all likelihood the dream will cease, and he can go forward on a new phase of his Army career.

The case of Capt. Z is a little more difficult. He had, on one occasion, the particularly harrowing experience of seeing his navigator's head blown off by flak. The navigator was a very close friend of his. He was so shaken by the experience that he was sent to a rest-home for two weeks, but eventually came back and finished his tour. He thinks he has recovered from the shock of that experience, but he has not. It lies buried within him much as a splinter can lie buried within a finger. And like the splinter, it must be removed, or it will fester. In the case of Capt. Z the festering has manifested itself in some of the above symptoms.

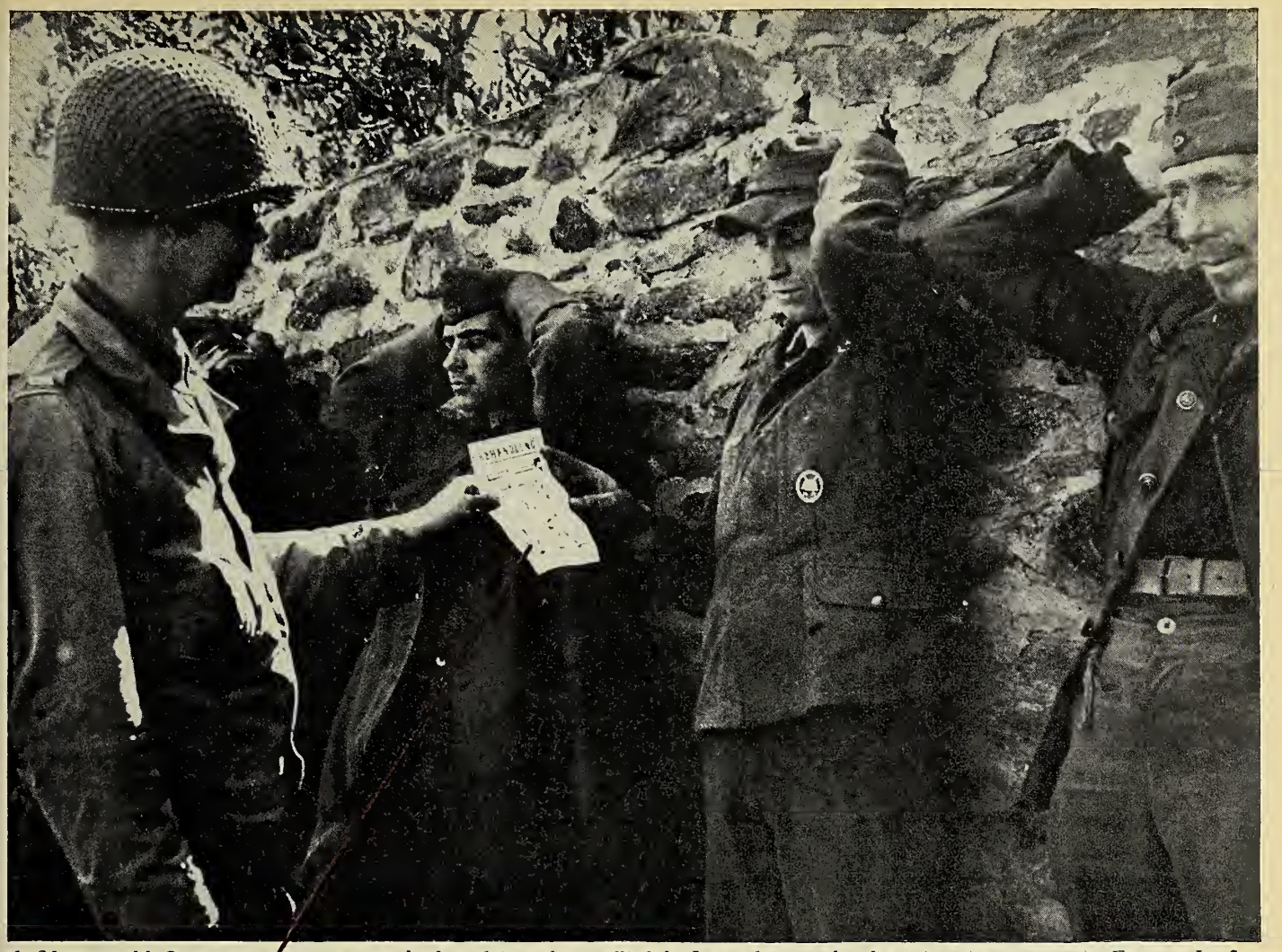
Just why 're-living' the experience under psychiatric guidance will relieve tension and allow the healing processes to begin is something that no one fully understands, but everyone has experienced the sense of freedom and release that comes from 'getting something off your chest'. In any case, once the pent-up emotions centering around this experience have been liberated, Capt. Z can begin to live normally again.

In mild cases, group therapy, discussion and minimum 'ventilation' of the problem usually suffice to send the patient back to duty in a relatively short time. But sometimes the conflict is buried so deep in the patient's mind that a more lengthy process is required. In such case, AAF psychiatrists can occasionally speed up the process by using pentothal sodium. This medicine is a sedative which saves valuable time by enabling the doctor to uncover repressed ideas in the patient's mind more rapidly than would otherwise be possible. It has no harmful effects whatever; the boys wryly call it "flak juice."

In this treatment, the patient does not fully lose consciousness when the pentothal is administered. He remains aware that he is in the hospital being questioned by a doctor. In successful reactions he may relate, in his own words, the combat incident that sometimes lies at the root of his difficulties. He may describe it very dramatically, and the emotions thus liberated can be extremely strong. The material is not always confined to battle experiences; older struggles within the personality may appear, thus simplifying the task of the psychiatrist in subsequent therapy. The pentothal treatment is not always an unqualified success, but doctors at the Don Ce-Sar feel that it is more effective than the artificial rest treatment by prolonged narcosis that was developed earlier in the war.

At bases to which combat returnees may be sent, it is extremely important for flight surgeons and commanding officers to familiarize themselves with symptoms of operational fatigue. Early recognition of such cases saves much time and trouble in the long run. In the early days of the war there was a tendency among some commanders to view such symptoms as a deliberate attempt to evade combat. The fact that such symptoms not only persist but sometimes grow worse *after* combat indicates the reality of such mental illness. Experienced observers feel that there is practically no 'malingering' as such in the AAF. The caliber and morale of its personnel are too high. If a man's behavior deteriorates suddenly, there is a strong possibility that he is ill and needs treatment.

Each returnee wants to feel that his contribution to the Army is still important. The broad objective of the AAF Convalescent Hospital System is to restore the physically or psychologically disabled returnee's self-confidence and self-respect—to convince him that he has a job to do and can do it. The role that his new CO should play in this regard is obvious. If a man steps into a job that keeps him busy and gives him a sense of accomplishment, his readjustment to non-combat life is much easier. The doctors at the Don Ce-Sar do not worry about their discharged patients who find such CO's and such jobs. They know that further treatment will not be necessary. ☆



A 24-year old German paratrooper took the advice of an Allied leaflet and surrendered to American troops in France. Leaflets were prepared by Psychological Warfare Division of Allied forces and fired by light artillery into the area held by the Germans.

VICTORY THROUGH SALESPOWER

AAF pilots are crack salesmen in the psychological campaign to "sell" defeat to the enemy

Psychological warfare is the battle waged with ideas and words. Part of this warfare is the bombardment of enemy troops and civilians with airborne leaflets bearing messages to undermine their morale. To accomplish this, the AAF has many "aerial newsboys," pilots who deliver this printed propaganda to the enemy.

One of the latest developments in psychological warfare is the newspaper "Frontpost," which is printed in the German language and delivered daily to enemy foxholes by the 12th Air Force in Italy. It is designed to give the German soldier a straightforward account of the progress of both German and Allied war operations. The "Frontpost" has been instrumental in the surrender of thousands of enemy troops in Italy.

Psychological warfare is simply the means of using against an enemy the principles of suggestion and psychology which have been used in salesmanship since the beginning of time. It plays on the fears, hates and loves of the enemy. It is designed to undermine his faith in his leaders, his government, and eventually to destroy his morale and willingness to fight.

The lines of argument taken by Allied psychological war-

These thousands of leaflets represent one single attack upon the enemy's morale. The message of these leaflets is to make him stop and wonder if the fight is worthwhile. This new type leaflet bomb will carry five bundles and when packed weighs 500 pounds.

fare are as countless and unpredictable as are the changing situations of war. Long-range propaganda hammers away month after month on Allied war aims and emphasizes the ideals for which the Allies are fighting.

Sometimes it is merely a reminder, a question for the enemy to reflect upon and answer. Such propaganda was the purpose of leaflets showered down on the Jap-occupied territories during the Philippines operations. The Japanese had told their soldiers the AAF had been destroyed.

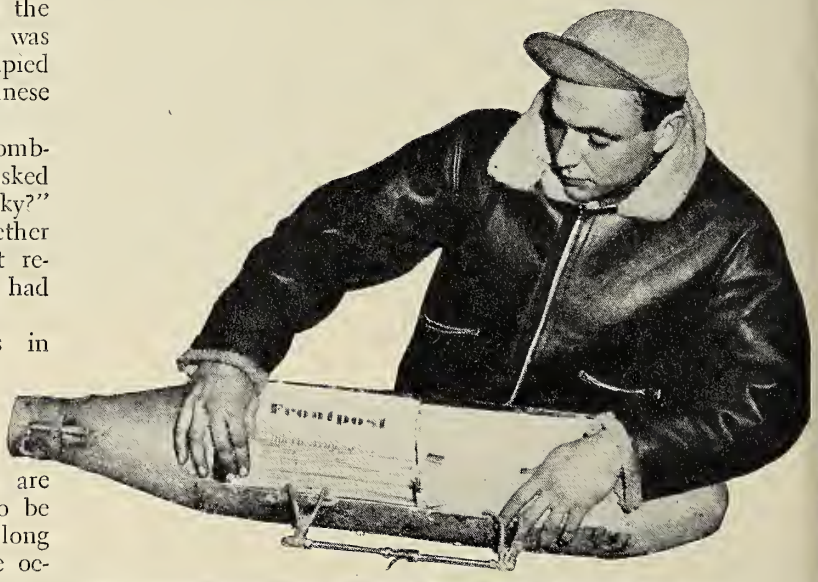
This leaflet, on one side, showed American heavy bombers in the air. On the reverse side was the message. It asked the Japs a simple question: "Whose planes fill the sky?" It asked them to look up at the sky and decide whether the planes they saw were Japanese or American. It reminded them that according to their rulers the AAF had been destroyed.

Through psychological warfare friendly elements in enemy-occupied territory are encouraged, promised sympathetic help after their countries are freed, and instructed how best to cooperate with the Allied military. Unfriendly elements are warned of the punishment which will overtake them, and civilians are warned to keep away from places which are about to be bombed. Even packages of seed have been dropped, along with friendly messages, in areas which would soon be occupied by the Allies and from which most of the food had been carted off by the enemy. The idea was that the natives would plant the seeds and grow vegetables, thereby lessening the problem of feeding them after Allied occupation.

Hundreds of leaflets flutter down into a Japanese-held village almost completely hidden by the thick jungles of Burma. Leaflets are designed to counteract Jap propaganda and give correct data about the progress of the war on this and other battle fronts.

The two chief vehicles for carrying the weapons of psychological warfare—words and ideas—to the enemy are leaflets and radio. In the strategic field, short and medium wavelength radio is the more important weapon. While vast quantities of airborne leaflets are scattered over the enemy home populations, more people hear the messages over their radio sets than see them in printed form. In the tactical field the reverse is true. Relatively few field soldiers have opportunity to listen to radio sets, and both Japs and Germans have systems of informers who keep vigilant watch on such activity. But, in spite of all their efforts and threats, both have been unable to keep their soldiers from reading and keeping the leaflets which are showered on them by plane and fired into their areas by artillery shells.

While the types of leaflets disseminated to friend and foe are infinite in number, the "surrender pass" shows the most tangible results. When a German or Jap comes over, shows a leaflet and tells the interrogator that its message had induced him to surrender, there can be small doubt that leaflets are effective. But the "surrender pass" represents only a small percentage of the total leaflets used, and the surrender of enemy soldiers is but a small part of the overall effect that psychological warfare is achieving.



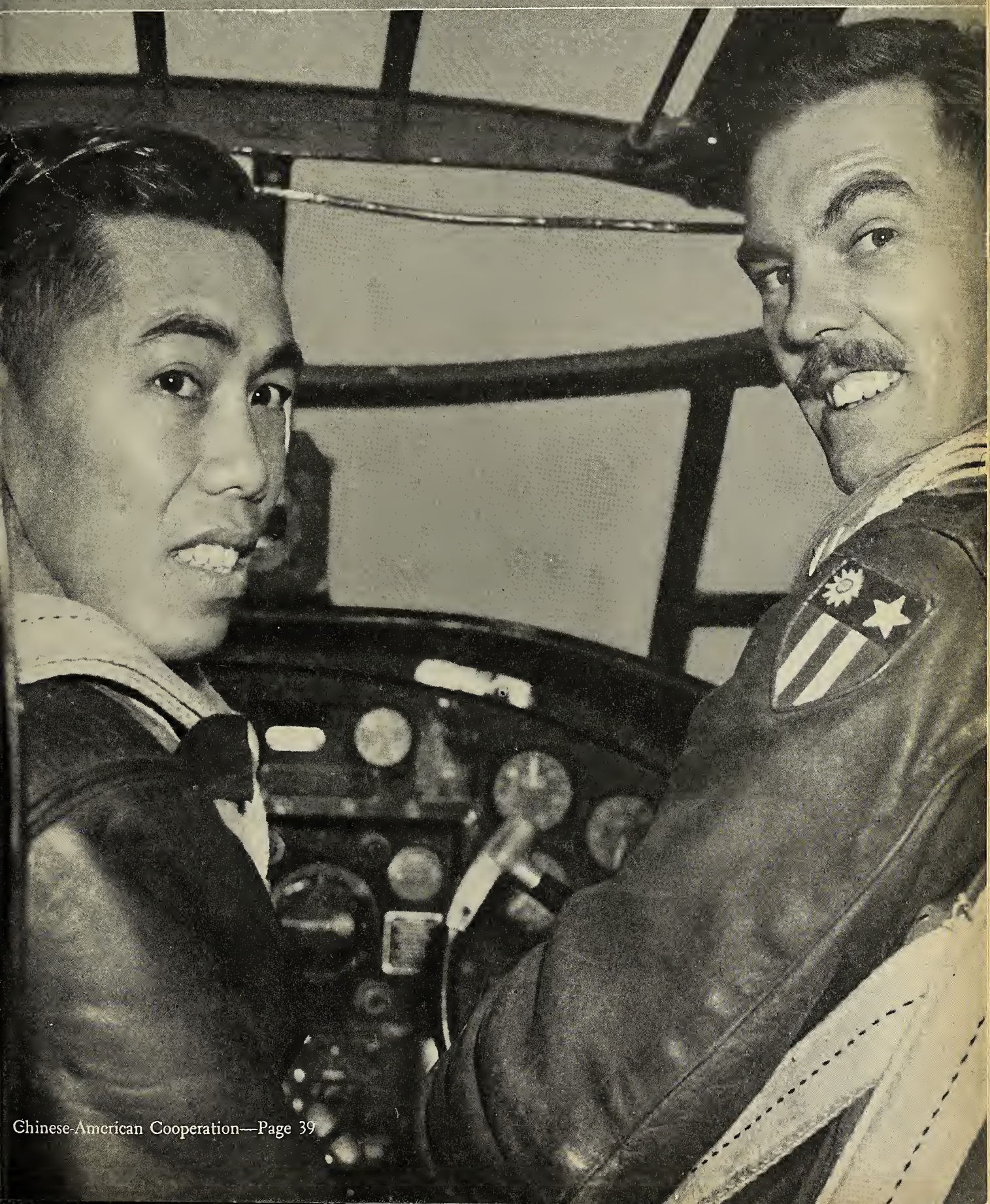
The German-language tabloid Frontpost, designed to give Germans the world news from an unbiased viewpoint, is distributed daily to enemy foxholes. It is carried in revamped practice bombs which open up on trigger release and dump the papers on their targets.

Airborne leaflets worked admirably against the Italians who valued them so highly that Arabs did a brisk business of gathering surrender passes and retailing them for the equivalent of two dollars each. Leaflets are effective against the Germans, and in the CBI they led to the surrender of Japs at Imphal, Kamaing and Myitkyina. An Army corps in the Philippines reported recently that during one week 278 prisoners had been taken, and that nearly all of them had been influenced by propaganda leaflets.

It is well known that propaganda is most effective when the tide of battle is running against the enemy, and for that reason airborne leaflets are expected to bring in greater numbers of enemy soldiers in the closing phases of the war. The more critical his plight, the more effective psychological warfare becomes. ☆

CROSS COUNTRY

News and Views around the World



Chinese-American Cooperation—Page 39

French Air Force

The French Air Force, badly beaten but not completely crushed in 1940, has returned to a place of importance in the European Theater of Operations.

When France fell many of its flyers, with Allied assistance, set out for England and to the Middle East to continue the fight with the RAF. Others remained behind to become part of the so-called armistice air force—a token organization under the control of Vichy and limited to a handful of squadrons.

In 1941, England made the first important move in reestablishing the French Air Force as a fighting organization. Two French bomber squadrons—the Lorraine and Bretagne—were equipped and fought during the African campaign. The Ardennes fighter squadron—a DeGaulle unit—did good work in the Middle East. Other Frenchmen flew with the RAF from English bases.

When the Americans landed in North Africa they immediately assumed a large share of the burden of revitalizing the French Air Force. One of the first moves of the AAF was to put the famous Lafayette Escadrille back into the air. They furnished the squadron with P-40s in November of 1942 and were rewarded when the Escadrille handled itself well in the Tunisian campaign and the invasion of Sicily. Other French units benefited from the flow of American supplies.

Soon after the liberation of Paris in 1944, the AAF moved to restore a sizeable French Air Force on French soil. With many of the pilots and crews who served in Africa as its beginning, the First French Air Force was established last October. Under the careful ministrations of AAF experts, the French First is developing. At present its bomber groups fly Marauders and its fighter pilots go out in Spitfires and Thunderbolts. The AAF also has turned over some Lightnings and Mustangs for reconnaissance work.

The British are continuing to lend a helping hand. French airmen still are operating with the RAF in Spitfires and Lancasters. There are also some Frenchmen flying P-39s with the MAAF while another French group is serving with the Russians.

Along the coastal pockets where isolated German garrisons still hold out, the Atlantic French Air Force, commanded by General Edward Corniglion Molinier, an ace of World War I, is battling le Boche with JU-88s, Potez 63s and anything it can lay its hands on and put into flying condition.

It is the intention of the AAF to place the First French Air Force on a self-sustaining basis. This won't be an easy job for it means that the Americans will have to supply the units under their operational command with everything that is needed in the way of supplies and equipment. The aim of the AAF is for these units to operate efficiently once they are back on their own.

French pilots trained in the United States are already flying in combat, but there is a need for more mechanics. The French are learning American operational techniques from AAF officers, and technicians from American aircraft factories are on hand to give needed advice. It is a slow process, but AAF chiefs in France think the First French Air Force should be doing pretty well for itself within a very short time.

French airmen drink—to a new start under their own flag

Reminders

To make P-47 trainees more safety conscious, reminder signs have been placed off the edge of taxi strips leading to runways at Bradley Field, Conn. As a pilot taxies out to the runway his mind is jogged by five signs, spaced along the route. They say, at proper intervals: Use ALL of Runway . . . Fasten Shoulder Harness . . . 91 Octane . . . Cockpit Check . . . Look Behind Before Runup. After landing, and on his way back to the parking ramp, the reverse of the signs read: Stop to Raise Flaps . . . Log Correct Time . . . Open Cowl Flaps . . . Are you "S"ing . . . 7-8000 RPM While Taxing.

Although these prompters are repeated often in briefing, Bradley Field's safety record has improved considerably since the signs were installed.

Welcome

Orientation is a common term to Army recruits, but to 175 former infantrymen at an AAF Service Command air depot in Italy, the word has a new meaning. Reassigned from ground combat forces for physical reasons, the men are being trained for their new jobs of servicing and repairing AAF bomber and fighter aircraft, operating airbases, or constructing airfields.

To bridge the gap for the men who came from a service where the emphasis was on combat effectiveness, to one where, for them, the emphasis will be on technical skills, the need was recognized for an orientation program which would be timely and effective both to the Air Forces and to the new men.

Accordingly, a program has been designed "to remove some of the mental confusion that inevitably exists in the minds of recently transferred men," says Capt. Phil E. Allen, group adjutant and one of the key officers behind the program.

"We want to show the new men that we are proud of what they have done in the past, and that we will do everything in our power to make their life here as air force soldiers the best possible," Captain Allen said.

In the first phase of the orientation, the men were conducted on a tour of depot installations and shown at first hand the workings of the depot. The second phase was

devoted to a two-week school to teach the men the many-sided and technical nature of supply work.

After completing the school training, the men will be transferred to on-the-job training where they will engage in the actual work of the depot. The length of this phase of the training will be dependent upon the individual's display for ability for assignment to a job.

Chinese-American

The two men on Cross Country's cover this month are Col. Irving L. Branch and Maj. H. Y. Lee. When the picture was taken they were co-commanders of a B-25 Group in the Chinese-American Composite Wing. (Colonel Branch has since returned to the United States.) This is the only outfit of its kind and in it Chinese and American flyers fight side by side. The wing also has two fighter groups, and is under the command of Brig. Gen. Winslow C. Morse.

The personnel ratio is approximately one American to four Chinese. Most of the Chinese flyers were trained in the United States but some came directly from the Chinese Air Force. One of the chief purposes of the wing is to teach Chinese flyers American combat methods. Operating under the 14th Air Force, it has nearly 18 months of combat behind it. It often has operated on a night and day basis.

Stationed in the forward China combat area, the wing has had the job of stopping everything that moved, over a wide area, in the air, on land or water. The CACW did a lot of strafing by day, and stopped most of the road and river movement; so, the Japs began to wait for moonless nights to move their supplies. Further to slow supply movement a plan was worked out that involved deck strafing by B-25s—on moonless nights.

Flying low down the valleys, the B-25s located convoys and strafed them until all lights were extinguished, and then proceeded to drop their bombs on other targets. The Japanese, after a period of quiet, would attempt to move the convoy, only to be attacked again by the returning bombers. In this manner, a small number of B-25s kept large truck convoys stationary during the night and made possible their destruction by fighters the following day.

The B-25s have had one big favorite daylight target, a very important Yellow River bridge. It has been knocked out by the mediums, rebuilt by the Japs and knocked out again so many times that the flyers have lost count.

As for what the fighters do by day, we cite the sortie results of one good weather day. This day was by no means outstanding; it's just typical.

On river and road sweeps, the CACW P-40's destroyed 11 locomotives, three railroad cars, 25 buildings, four trucks, one sampan, two machine gun positions, 26 horses, two tanks, one watertower, two radio stations, one compound area, 69 Japs and 31 fighters and bombers on the ground,

QUESTIONS
on Policy and Procedure

Q. Are officers appointed in the AUS and assigned to duty in the Air Corps entitled to receive, upon release from active duty, the additional $500 lump sum payment for each complete year of active duty with the Air Corps provided for certain Air Corps Reserve Officers?
A. *No. (Opinion of Comp. Gen., B-44390, 5 December 1944, as shown in Bulletin of The JAG, No. 12, Vol. III, December 1944, page 530.)*

Q. Does the GI Bill of Rights require that a veteran must be experienced in order to obtain a loan to start a small business?
A. *One of the principal requirements of the law is that the ability and experience of the veteran and the conditions under which he proposes to pursue such occupation are such that there is a reasonable likelihood that he will be successful in the pursuit of such occupation. This clause is in sec 503, chap V, title III.*

Q. Can the terms "allowance" and "allotment" be used interchangeable?
A. *No. Many letters received by the Office of Dependency Benefits refer to both family allowances and Class E allotments of pay as "allotments." Incorrect use of these terms causes delays in replying to inquiries and in processing the cases because each benefit is handled in a separate division of ODB. A family allowance consists of a contribution made by the soldier known as a Class F deduction on the pay roll and a contribution added by the Government. A Class E allotment of pay comes entirely from the serviceman's pay.*

Q. What is the recommended amount of cash to be taken by personnel going overseas?
A. *Personnel should convert all surplus holdings of United States currency into Treasury checks or travelers checks of the issues authorized in Cir. 364, WD, 1944. Normally not in excess of $50 in cash should be retained. Personnel should not plan to negotiate personal checks after arrival overseas. (Par 34, b, sec VII, POM)*

Q. Is service in the Woman's Army Auxiliary Corps counted for the purpose of computing longevity pay of Wacs?
A. *No. (Sec I, Cir 64, 1945)*

Q. Are any Air Corps Circulars still in effect?
A. *No. The last two circulars were rescinded by AAF Reg 0-3, 26 February 1945. The entire series is now terminated.*

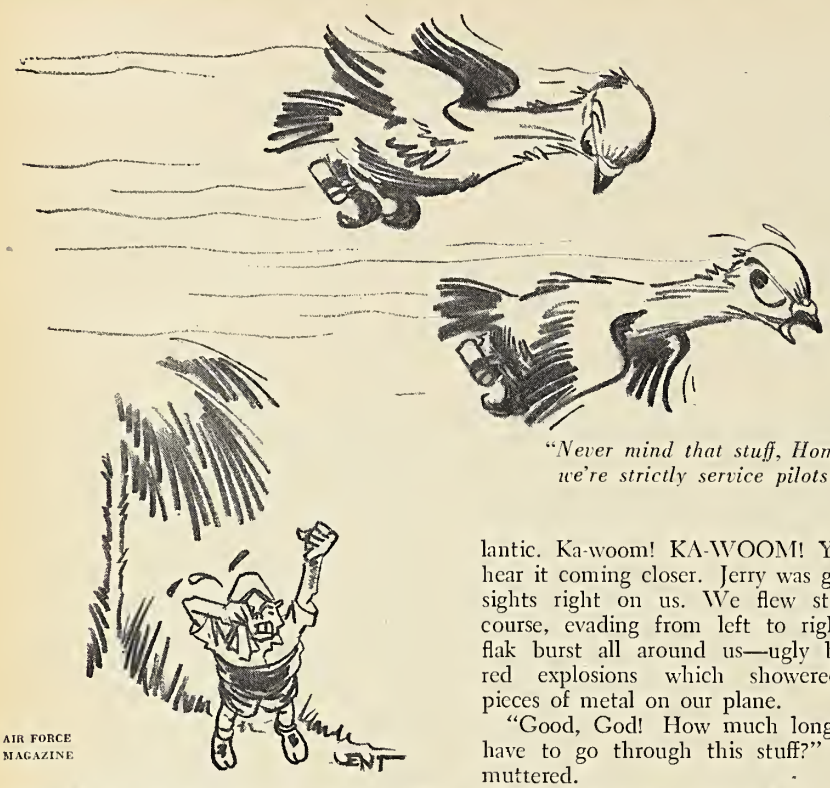
Q. Is there any provision for commissioning an AUS officer in the Regular Army at this time?
A. *No. However, it is a logical assumption that such provision will be made to cover commissioning in the postwar period.*

Q. In what grade will an enlisted man of the Regular Army, who serves on active duty as a Reserve Officer or who is discharged to accept a commission in the Army of the United States, be entitled to reenlist in the Regular Army after the termination of such commissioned service?
A. *In the permanent grade held in the Regular Army immediately preceding the commissioned service. However, during the present war and such further period as the Secretary of War may prescribe, upon reenlistment in the Regular Army, such enlisted men will be immediately appointed in the Army of the United States to any higher temporary enlisted grade held by him immediately preceding his commissioned service. Application for reenlistment must be made within 6 months after the termination of commissioned service. (Par 19d, AR 600-700, 30 September 1942, as amended.)*

Q. When allowances in T/E 21 equipment are decreased or suspended, is it intended that the excess created be taken up from personnel immediately?
A. *No. Decreases or suspension of T/E 21 are emergency measures, and it is not the intent of such action to remove equipment already in the hands of troops. Items issued subsequent to suspension or decrease will be governed accordingly.*

Q. Were the increases in pay for officers, effective 1 June 1942, for the duration of the war only? What were the increases?
A. *There is no restriction in the legislation which authorized the increases regarding their effective period. Base pay of officers in the 1st period (2nd Lts.) was increased from $1,500 to $1,800. Subsistence allowances for officers was increased from 60 to 70 cents per day.*

PREPARED BY THE OFFICE OF THE AIR INSPECTOR



"Never mind that stuff, Homer, we're strictly service pilots!"

damaged 42 railroad cars, 11 sampans, 172 buildings, one large barge loaded with supplies, two compound areas, one railroad tower, three tanks, eight machine gun positions and one warehouse, and four Jap aircraft.

During one two-week period, the 5th Fighter Group of the CACW hit the same Jap airfield three times, destroying approximately 70 enemy planes on the ground and in the air for the loss of only two.

Many of the CACW's missions have been over the China Sea and it has also hit Formosa.

Hot Minutes

Every combat man has his own words for describing the bomb run, some more articulate than others. Flight Officer Leonard Nelson of the ETO has set down a little thumbnail sketch called "The Hot 10 Minutes," which describes the bomb run very well. Here it is:

It takes four hours for our group to reach the average target, and most of our bomb runs take about 10 minutes. Ask anyone who has done it—the four hours go like minutes, the 10 minutes last an eternity.

As usual, the sky ahead was black. It reminded me of attending the theater, but instead of waiting for the curtain to go up, you fly through it, slicing your way with the propellers. Fred, our bombardier, peered ahead and put his hand to his cheek, then shook his head from side to side. Fred always claimed that the flak looked thicker on each successive mission, and this time I agreed with him.

Suddenly we were in the thick of it. Our B-17 was like a Central Park rowboat which had fared out into the stormy North Atlantic. Ka-woom! KA-WOOM! You could hear it coming closer. Jerry was getting his sights right on us. We flew straight on course, evading from left to right as the flak burst all around us—ugly black and red explosions which showered jagged pieces of metal on our plane.

"Good, God! How much longer do we have to go through this stuff?" the pilot muttered.

"Only another minute," I answered. Where I got my optimism I don't know.

Seconds lasted hours, as nine of us waited for Fred to call bombs away.

"Ten seconds to go," Fred called slowly, and in those 10 long seconds my heart must have made 50 visitations to my mouth and back.

"Bombs away!" Fred yelled, and the radioman keeping watch in the bomb bay hoarsely acknowledged his cry.

Pat banked the ship viciously to the right, setting her on one wing, and shoved the throttle full forward. The engines thundered and the big ship shivered in the turn. Oh, beautiful!

Flak burst right where we would have been, and in a matter of seconds it was upon us again — but the weight of bombs was off our minds and out of the plane. Without bombs I had supreme confidence that Pat could fly at 50 feet through the Black Forest without scratching the paint. Almost immediately the flak became thinner, and only an occasional burst came close enough to be heard.

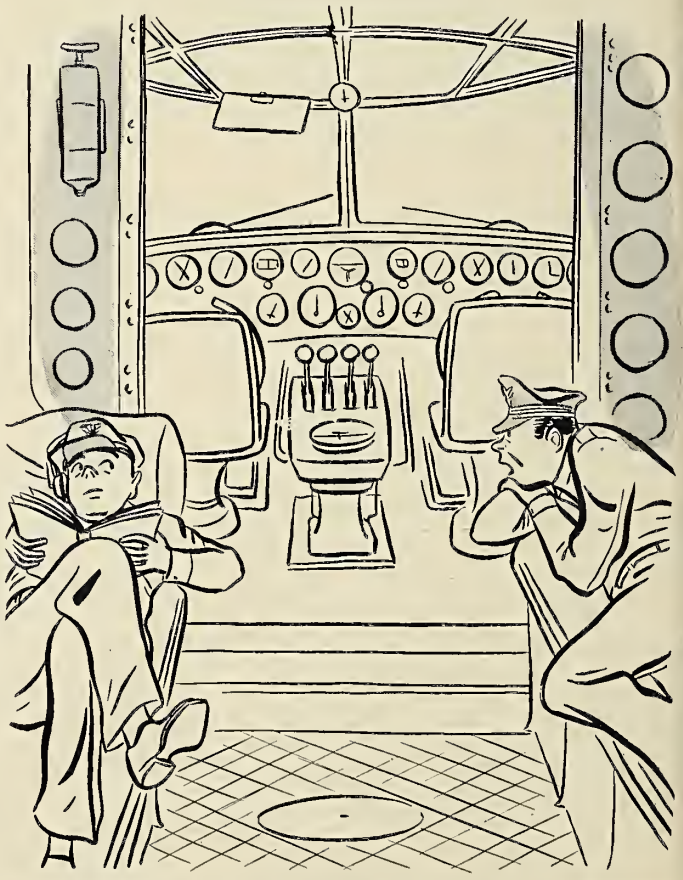
Below us a tank factory went up in flames, and as the smoke cleared there was no factory there. Off to our left two Fortresses went down and for a few moments we were quiet, counting the parachutes and wondering who had gotten it that day.

The Fort eased back to its cruising speed; the formation got together again; planes swung slowly around and pointed their noses toward home. Fred picked up his H. L. Mencken and began reading about the foolishness of religion—but I knew his other side. (He prayed like a demon on every bomb run.) I went back to my logs and maps, and the business of navigating.

The hot 10 minutes were over for that day.

Save That Chute

Several plain and fancy tricks described in "Save That Chute," an article which appeared in AIR FORCE recently, have been incorporated into a definitive AAF Manual, No. 60-1, called Emergency Uses of the Parachute. The booklet, prepared by the Arctic, Desert and Tropic Branch of the AAF Tactical Center, Orlando, Fla., de-



"You don't think we're taking the name 'automatic pilot' too literally?"

scribes 45 emergency devices which can be made from a parachute. The 24-page booklet is designed to fit in a pocket of the parachute pack with the Parachute Log Record. It is printed on waterproof stock and when folded the new AAF manual is about three and a half by two and one eighth inches.

Retired List

The Officers Honorary Retired List has been established "to provide a measure of recognition for officers and former officers of the Army of the United States, not members of the Regular Army, who have served faithfully and well for long periods of service or during national emergencies." The list is established by Section 1, General Orders, No. 11, War Department, 1945.

AR No. 605-255, dated Feb. 24, 1945, provides that the list will be published annually as a section of the Official Army Register. Former AUS commissioned officers are eligible if they meet any of the following requirements: Reached the age of 60; completed 15 years of honorable service in active or inactive status; become physically disqualified for general military service not as result of misconduct or undesirable habits; served honorably in time of national emergency but not eligible because of age or physical condition for appointment or reappointment in the National Guard or Officers Reserve.

No pay and allowances accrue and officers will be placed upon the list only upon their own application to the Adjutant General.

Grasshopper

Here's what T/Sgt. Glenn C. Basset, a liaison pilot in CBI, has to say about his life and times in a Cub:

"It took me a long time to get over the disappointment of being rejected for pilot training. But finally, somebody told me about Civilian Pilot Training. I got into that as soon as I could, but wasn't too happy. I kept thinking I should be flying a bomber.

"After a great deal of marching I was put in a replacement training unit and did some flying with the infantry, artillery and tanks. In contrast with basic training this was wonderful, sailing around above those boys who were in mock battles on the ground. It was not as good as bomber training would have been, but at least I was in the air, and not on the ground.

"After training with the Ground Forces five of us Liaison pilots were alerted and told we would be shipped out to the Mediterranean. I had gotten pretty well acquainted with one of the other pilots and we decided it would be a good idea if he also got on that shipping list. He went to see the CO.

"When he came back from making his request he told me he had been reminded again never to volunteer. 'I told them I wanted to go along with you, and they promptly messed it up. They took me—and dropped you from the shipping list.'

PLANE BONERS

Analyzed by Veteran Pilots

VICTORIA, TEXAS—After landing peel-off, P-51A pilot entered base leg with gear down and locked. Warning light for right wheel showed green, left wheel light was out. Pilot landed with right wheel extended and left wheel only three-fourths down.

Comment: Ignoring warning lights doesn't add to their value. This pilot assumed that gear was down and locked because one light showed green and the other one wasn't working. Much safer procedure when lights aren't working is to buzz by tower for confirmation as to gear's position.

PYOTE, TEXAS—B-17 pilot felt an impact and heard a noise from his No. 2 engine while warming up for takeoff. Looking out he saw a red substance on the ramp below which looked like blood. Cutting switches, the pilot investigated and found that his No. 2 prop had struck an officer, killing him instantly.

Comment: What this officer was doing around the plane is unknown. Evidently he either fell or stepped back into the prop while in the vicinity of the navigator's escape hatch. Keep away from spinning props, they're sure death.

LONG BEACH, CALIF.—Right wing of a P-51D snapped off at the root when the pilot, during a ferry flight, zoomed into a speed dive, subjecting the plane to greater stress than designed for. The fighter went into a horizontal roll, then over into a tight spin straight to the ground. The pilot was killed.

Comment: Witnesses observed this plane cutting sky antics several minutes before the death-dealing dive. If the pilot had not broken ATC regulations about acrobatics while ferrying aircraft he would not have killed himself through lack of knowledge on stress limits.

TOPEKA, KANS.—Emergency wheels-down landing was made in a cornfield by an out-of-gas AT-11 just before reaching an airport. Plane was wrecked and four occupants injured.

Comment: Evidently this pilot is a slow-learner. Although he had almost 1,000 hours flying time he took off from Chicago without a definite idea of his fuel supply. In landing, to add to his amateurish flying sense, he picked a downwind field when several upwind fields were available.

RENO, NEV.—Pilot in C-46 made instrument takeoff and ordered copilot to retract gear. Copilot, not familiar with the procedure, fumbled around, causing pilot to glance down. While pilot watched copilot work on gear handle the airplane lost altitude, struck the ground and burned.

Comment: If the pilot had made certain his copilot understood landing gear procedure he would not have had to take his eyes from the instrument board and would have noticed the loss of altitude. In this particular case safety would have been added to the instrument takeoff if landing lights had been kept on until they were no longer of any use as takeoff direction was away from all ground lighting.

MARIANNA, FLA.—A-26 pilot dropped his gear at an excessive speed. Nose gear wasn't down and locked when plane landed and it skidded on its nose 1,300 feet before stopping.

Comment: Tests revealed that landing gear warning lights worked perfectly. Nosewheel green light was not on and red light was. By checking warning lights and observing travel of nosewheel through visual inspection plate this accident would have been avoided. Pilot Training Manual for the A-26 points out that nose gear should not be operated unless airspeed is 160 mph or less. At higher speeds it may not extend properly.

BURLINGTON, KAN.—After the engine of an A-24 quit during flight, the pilot made an unsuccessful attempt to restart it by switching to a full gasoline tank. In the emergency, he landed wheels down in a rough field. Although the landing gear was damaged slightly, he took off for his home station as soon as he got the engine going.

Comment: Violating the rules of common sense as well as AAF regulations, this pilot was lucky to reach his station alive. He invited disaster twice, first by ignoring fuel tank change procedure and again by taking off in a damaged plane without clearance or an engineering check.

PREPARED BY THE OFFICE OF FLYING SAFETY.

NEW BOOKS

AT WAR

CARRIER WAR. *Oliver Jensen.* A first-hand story of Task Force 58 and a year of war in the Pacific. N. Y., SIMON & SCHUSTER, 1945.

TWO HUNDRED THOUSAND FLYERS; THE STORY OF THE CIVILIAN-AAF PILOT TRAINING PROGRAM. *Willard Wiener.* The record of the AAF's Contract Pilot Schools in training Air Forces pilots. WASHINGTON, INFANTRY JOURNAL, 1945.

POSTWAR

CAREERS IN THE STEEL INDUSTRY. *B. W. Leyson.* The making of steel and the opportunities for a career in this industry. N. Y., DUTTON, 1945.

TECHNICAL

CARE AND USE OF HAND TOOLS. *R. R. Toliver.* Describes and illustrates the handling of common tools used in machine shops. N. Y., WILEY, 1944.

HANDBOOK OF AIRPLANE MAINTENANCE AND OPERATION. The assembly, service, maintenance, and overhaul of aircraft, engines and accessories. N. Y., NATIONAL AERONAUTICS COUNCIL, INC., 1944.

AN INTRODUCTION TO ELECTRONICS. *R. G. Hudson.* The new science of electronics with its present applications and future implications. N. Y., MACMILLAN, 1945.

MANUAL OF AIRCRAFT LAYOUT. *Rudolph Faltus* and *Charles Steinmetz.* Covers instruction in blueprint reading, template development and uses, and related topics. N. Y., WILEY, 1944.

METHODS IN CLIMATOLOGY. *Victor Conrad.* Presents methods of mathematical statistics applicable to climatological problems. CAMBRIDGE, MASS., HARVARD UNIVERSITY PRESS, 1944.

MILITARY AND COMMERCIAL AIRCRAFT HYDRAULICS. *R. N. Greif.* Covers one of the important functioning systems of the airplane. N. Y., PITMAN, 1944.

NEW WORLD OF MACHINES. *Harland Manchester.* A non-technical discussion of radar, high-octane gas, the turbo-supercharger, the helicopter, plastics and other new materials. N. Y., RANDOM HOUSE, 1945.

ROCKETS AND JETS. *H. S. Zim.* Latest facts about rockets and jet-propelled planes including battle rockets and post-war possibilities. N. Y., HARCOURT, BRACE, 1945.

YEARBOOKS AND HANDBOOKS

METALS AND ALLOYS DICTIONARY. *Menahem Merlub-Sobel.* Over 10,000 definitions of metallurgical terms, composition, properties and uses of the important commercial alloys. N. Y., CHEMICAL PUBLISHING CO., 1944.

These books are available to AAF personnel through the AAF Field Technical Library Service, which provides for technical libraries at all major installations. For personal copies contact the publishers or retail bookstores. List compiled by AAF Headquarters Library.

"That was true. But a few days later I, too, was on my way—to Karachi, India, where I found they didn't know about Liaison pilots. In fact, the CO had never heard of such a thing. Finally they located a liaison squadron and we were sent to join it.

"My first operation flight was simple. A veteran pilot crawled into his plane, and told me to follow him. That was the briefing.

"I got on his tail and followed him over the hills and we went down on a little jungle strip. We picked up some wounded Chinese infantrymen and flew them to a hospital.

"That was pretty good, but it wasn't dropping bombs. I still had an idea you had to drop bombs from an airplane to make it worthwhile.

"From that day forward I seemed to be flying all the time. I hauled supplies to the front and brought out wounded Chinese, Ghurkas, Africans and Indians. I learned to do things with that little aircraft. I could feel my way along the bottom and fly when the ceiling was almost on the trees. I was flying day after day when bombers and fighters were sitting on the ground.

"I began to realize what I had when bomber pilots came around hoping to get a ride. Sometimes they would take a plane up and wring it out. One of them said, 'Sergeant, flying this thing is a pleasure. When you sit down at the controls of a B-24 you're in big business, with all the worries.' By that time I wasn't feeling too bad about being rejected for pilot training. I had come to think of my Cub as something personal—all mine.

"Then one day I was assigned to go into Northern Burma and bring out some wounded boys who were part of Merrill's Marauders. On the way back one infantryman with a serious leg wound called to me.

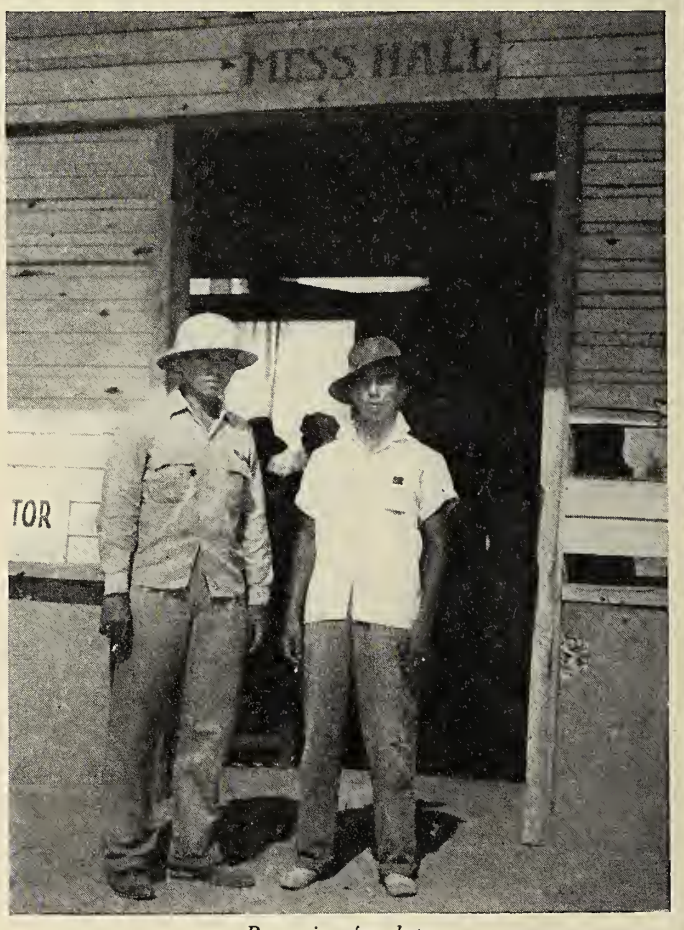
"The plane was so quiet that we seldom used the communication system. 'Hey, pilot!' he said. 'Back in the States I used to hate your guts. Especially when I'd see you Air Force guys sailing over me during maneuvers. Now I take it all back. How long before we get to a hospital?'

" 'Two hours by air,' I said. 'By other means, three weeks.' And as I said it, I realized I was proud of my plane, my job, and my squadron."

Reception

When our invasion forces landed at Lingayen, Luzon, P.I., on January 9, they were enthusiastically greeted by two young AAF second lieutenants who were wearing their glistening gold bars and pilot's wings for the first time since May 1942.

Lt. Jose M. Rico (left) was stationed at Zablan Field, Manila, with the 10th Bomb Group (L) when the Japs struck at the Philippines. When he was captured on Bataan, he pinned his lieutenant's bars and pilot's wings to his underwear. As a result the Japs didn't know his military status, and he was released six months later. He established himself as a merchant at Lingayen, got in touch with the Filipino guerrillas in the hills and worked with them right under the Japs' noses.



Reporting for duty

Lt. Rafael N. Diaz (right), also a member of the 10th Bomb Group, was on Mindanao when the Japs invaded that southern Philippine island. He escaped and after fighting with the guerrillas for seven months, made his way back to Luzon, where he joined Lieutenant Rico in his Jap-sabotaging activities.

On the day after our troops landed on Luzon, both lieutenants reported for duty to the engineer in charge at Lingayen and went to work on the airstrip.

The mess hall sign over the doorway weathered the entire Jap occupation and dates back to before the war when the Lingayen strip was an AAF training field.

Shot from the Sky

More than seven million Americans have now seen the traveling exhibit of captured enemy aerial equipment presented throughout the United States by the Army Air Forces. How much the home folks have been impressed can be surmised from the record of 32,000 persons who have signed up for war jobs either at the exhibit or as a direct result of it.

10,000 pieces—10,000

The 23-acre exhibit of enemy planes and equipment, called "Shot From the Sky," has had an additional value in reducing absenteeism and labor-turnover and is credited with improving industrial morale in areas where it has been shown.

The 10,000 pieces of Axis equipment, making up the exhibit, is carried in Army trucks, vans and trailers which have been retired from combat service. There are 60 enlisted men working with the show, nearly all of whom are veterans of overseas service, representing every combat Air Force. Assisting the men are 43 Wacs who travel with the exhibit. Five officers are in charge of "Shot From The Sky."

Lifeline Pioneers

A letter from Col. Julius A. Kolb, Chief of Staff, Hq., 51st Troop Carrier Wing, fills us in on some interesting background material on the Northwestern ferrying route, described in "Lifeline to the USSR" (AIR FORCE, November 1944).

As group operations officer of the 62nd Group, Colonel Kolb in September 1941 was directed to make a flight to Fairbanks, Alaska, surveying prospective sites along the way for stops on a supply ferrying route from Dayton. With three other pilots, a crew chief and a radio operator, Colonel Kolb made the flight in a C-39, starting from Sacramento and going by way of Tacoma, Seattle, Spokane, Edmonton, Grande Praire, Fort Nelson, Watson Lake and Whitehorse. They were en route six days.

They found landing fields of some sort at all these places, but radio ranges were only in process of installation. Canadian authorities and operators of commercial lines were interviewed, and a report made to Dayton and Washington outlining existing facilities and dates for the completion of additional fields and radio facilities. During February, March and April of 1942, the 62nd Group operated a C-53 from Edmonton to Fairbanks, linking up with a 10th Group C-53 which made the run from Dayton to Edmonton. It was during this period that the first B-26s and P-40s, winterized at Sacramento, were flown northwest to Fairbanks.

Thus Colonel Kolb and his men are entitled to an honored place among the pioneers of flying in this area (among whom are General of the Army H. H. Arnold, who led a mass flight from Washington to Fairbanks in 1934; Maj. Gen. Ralph Royce, who conducted pre-war surveys of the same territory; and the many commercial and bush-pilots who added their experience to the total). When war necessity dictated mass delivery of planes to Alaska in the summer of 1942, as described in "Lifeline to the USSR," a groundwork had already been laid by the 62nd Group.

Service Flags

The War Department recently issued a circular which designates the proper position of stars and service insignia in the official service flag authorized for display by individuals and organizations. Where a service flag bears both a blue star and gold star, the gold star will be above the blue star, when the flag is displayed in a vertical position, and at the left when displayed in horizontal position.

Where a design of the service lapel-button, issued to discharged veterans of World War II, is included in the service flag, this will be located below the blue star when the flag is vertical, and at the right when horizontal.

Doing A Job

Every now and then you hear those vicious little stories about how different branches of the Army do not get along, how they indulge in intra-service jealousies at the expense of combat efficiency. Almost traditionally these yarns concern the Infantry and the Air Force.

From Lt. Jack Fern, public relations officer of the 7th Air Force Fighter Command, comes a far better and more accurate story concerning the AAF and the Infantry. It happened in the Marianas. Three P-47s came back from dive bombing Pagan with ragged holes through wings and fuselages, put there by sharp-shooting Jap antiaircraft fire. A mechanic had just stepped back from examining one of the planes when a small infantry soldier asked, "Did they all get back OK?" The infantryman, unnoticed until then, said he had just come down from the fighting front in the hills of Saipan. He was dirty and tired, and his face was lined with the strain he had been through.

"Yes," the mechanic said, "They all got through." The infantryman nodded his head, "That's fine," he answered. "We can't spare those guys, they're really doing a job." With that he turned and walked on down the road—a little guy in dirty clothes and a battered tin hat, carrying a clean, well-oiled rifle.

As he walked away one of the fighter pilots who had overheard the conversation stared after him. "Did you hear that?" he asked. "Him worrying about us! I wouldn't changes places with that guy, go through what he's going through, for all the tea in China."

In the Spring

It may be just as well at this time to eliminate an erroneous impression now making the rounds—that every soldier wants nothing better in the postwar world than to gambol around the countryside in a jeep.

Airminded drivers of the 7th Air Force have used the jeep for everything in the line of transporting men and materials, but when anyone gets sentimental over the little car, they merely rub their nether ends and look woeful. Take the case of a driver in the Gilbert Islands. In a seven months' period he drove his jeep 10,000 miles on an atoll that measures only five miles from end to end. He was grounded for a rest recently when he was seen at dinner putting his fork in second gear while shifting from spam to

TRAINING AIDS

Newly Standardized for Field Use

FILMS

(Note: Refer to AAF Letter 20-83, "Distribution of Motion Picture Film Within Continental United States," 26 March 1945, for new film distribution policy.

TF 1-3433, 50-Hour Inspection of B-29, Part II—Wing, landing gear, hydraulic system and empennage. Running time: one hour.

TF 1-3434, 50-Hour Inspection of B-29, Part III—Electrical system. Running time: 30 minutes.

TF 1-3470, Fluid Flow in Hydraulic System—Basic laws of fluids for aircraft mechanic students. Running time: 10 minutes.

TF 1-3671, Aircraft Magneto, Part II, Theory and Operation of Eight-Pole—For basic aircraft mechanic students and electrical specialists. Running time: 10 minutes.

FS 1-2136, SCR-718, High Altitude Altimeter—Theory and operation.

FS 1-2141, B-29 Airplane Modifications: Fuel Flowmeter Type B-3A—First of series of important modifications presented in film strips.

FS 1-2154, A-17 Turret: Mechanical Principles of Operation.

AFFS 1250 through 1270, Line Maintenance and Servicing of V-1650-3-7 Engines.

DEVICES

Mockup Trainer, Type O-58 (Radial Engine)—For classroom instruction in basic principles and operation of a nine-cylinder Wright Whirlwind; consists of manually operated animated cross-section of engine.

PUBLICATIONS

Objective Briefing Folder (AF Manual No. 61)—To be used with projection-type Bombing Trainers, Types A-5, A-6 and A-7; gives complete picture of bombing problems, including pilotage, D/R, target identification and bombing run.

For Your Hide's Sake, Prevent Burns (AF Manual No. 48—Lessons on how many aircraft burns can be prevented by wearing proper flying clothing.

The Airplane Commander (AF Manual No. 65)—Sound, hard advice on how plane commander can weld combat crew into a team that has a better chance of returning home.

Syllabus of Basic Problems for the A-5 Bombing and D/R Trainer—Eight work-sheet problems containing data for teacher and pupil.

GRAPHICS

Cardboard Three-Dimensional Weather Maps — "Pop-up" graphics devices, three to a set, for basic weather training of aircrews. Consists of (1) Early Stages of Development, (2) Cold Type Occlusion and (3) Warm Front Type Occlusion, each of the three a stage in a typical cyclonic storm.

Ditching Posters (A-26, B-17 and B-24) — Thorough, standardized procedure for each plane, with specific directions for each crew member.

Calendar Chemical Warfare Posters—Latest four of the eye-catching series, covering March, April, May and June.

Caliber .50 Browning Machine Gun—Poster binder of 34 sheets illustrating, by cutaway and sectional diagram, the gun at work, the seven groups and cycle of operation. For classroom use in conjunction with G. I. F.

B-29 Fields of Fire and Fields of Search—Four posters, each of which reveals fields of fire and search for one of the four sighting stations. For classroom use in conjunction with "Gunnery in the B-29 "(AF Manual No. 27.)

RECOGNITION

Recognition Instructors Information Letters, No. 13 and 14—Of general interest to AAF activities. Letter 13 consists of data sheets on all operationally important Allied and enemy aircraft; Letter 14, data sheets on Allied and enemy tanks. Limited number of extra copies available.

Merchant Vessel Models — Sixteen types, in either miniature or teacher-type sizes. Initial distribution already made on basis of requirements submitted by respective air force and command headquarters.

Information on the availability of training aids listed in this column, unless otherwise indicated, may be obtained from the chief, Training Aids Division, Army Air Forces, One Park Avenue, New York 16, N. Y., upon request through channels.

bread pudding. Have a jeep after the war. . . . Well, some soldiers will want them. But the majority have expressed a preference for something with springs. Many more, and much softer springs.

New Full Generals

Three veteran air officers were among the nine Army lieutenant generals recently advanced to the grade of full general. They are General Joseph T. McNarney, Deputy Supreme Allied Commander in the Mediterranean theater, and former Deputy Chief of Staff of the War Department General Staff; General Carl Spaatz, commanding the United States Strategic Air Forces in Europe; and General George C. Kenney, commanding the Far East Air Forces.

Into the Fire

When a pilot bails out, he can usually discount his plane as a hazard to landing once his parachute opens and everything is proceeding well. This was not true for a flight officer who had to jump at 500 feet when both engines failed near Chico Army Air Field. At 500 feet a pilot has no time for sober consideration, so this flyer did the correct thing and jumped. His chute opened at about 100 feet and he drifted down—into the wreckage of his burning airplane. Fortunately the mishap had been seen from the Chico tower and an ambulance, crash truck and radio jeep were dispatched to pull the pilot from the fire. He was rescued and was in the base hospital 17 minutes after he bailed out.

Battle Honors

Since the last list of Battle Honors published in April Air Force, announcement has been made of the award of the Distinguished Unit Citation to several additional AAF units. The units, dates of actions and a brief summary of the citation as printed in General Orders of the War Department include:

March 4, 6 and 8, 1944

100th Bombardment Group (H)

Carried out its assigned mission of attacking the enemy capital of Berlin on each of the dates mentioned above, despite adverse weather conditions and the concentrated defenses of a powerful foe. In the final attack, on March 8, a telling blow was delivered to factories producing one-half the ball-bearings required by the Luftwaffe.

355th Fighter Group April 5, 1944

Located an airdrome deep in Germany after an hour and a half instrument flight necessitated by a heavy undercast and attacked the planes deployed there. In an attack lasting more than forty minutes, the group made repeated passes to destroy 51 planes on the ground and in the air, and heavily damaged another 81.

456th Bombardment Group (H) May 10, 1944

Attacked an aircraft plant at Wiener Neustadt, Austria, despite severe weather conditions and heavy enemy opposition. Though the lead plane was hit by flak and compelled to feather two engines, the pilot

persisted in his bombing run and led an attack that virtually obliterated the target.

82nd Fighter Group June 10, 1944

Executed the longest fighter-bomber mission till then undertaken in the Mediterranean Theater of Operations, against the Romano Americano Oil Refinery at Ploesti. Substantial damage was inflicted on the boiler house and other vital installations despite intense flak and dense smoke screening the target. During the return flight, planes of the group destroyed 11 locomotives, strafed 12 trains, shot down 5 enemy planes and destroyed 7 on the ground.

367th Fighter Group Aug. 25, 1944

Accomplished two missions against enemy landing grounds in France on the above date. After completing the first series of attacks (at Clastres, Peronne and Rosieres) the group encountered a flight of enemy planes and destroyed 25 of them in a lengthy encounter. In the afternoon, the group made an 860 mile fighter sweep (against fields at Cognac, Bourges and Dijon), destroying 16 parked planes.

Aug. 28, 1944

Third Photographic Group, Reconnaissance

Contributed in great degree to the rapid advance of our ground forces against a determined enemy by overcoming extremely difficult conditions to photograph desired area. All personnel collaborated on a twenty-four hour basis to prepare planes for flight, obtain photographs, process and interpret them and convey the material thus gathered to headquarters.

406th Fighter Group September 7, 1944

Located an enemy column in the vicinity of Chateauroux, France as it was attempting to flee through the Belfort Gap and severely mauled its personnel, transport and armored vehicles, destroying 300 military carriers of all sorts. Having expended its ammunition and left the road blocked for 15 miles, the group returned to base, rearmed and refueled in a minimum of time and returned to destroy an additional 187 vehicles, including 25 ammunition carriers.

AIR FORCE MAGAZINE WILKINSON

"Gosh, they don't forget a thing on these emergency landing rafts, do they?"

AAF Radio Show

The AAF has assigned combat radio reporter team to fighter and bomber squadrons operating over Germany and Japan to record first hand accounts of aerial warfare. From this material the Blue Network will broadcast a program each Saturday from 1:30 to 2 p. m., Eastern War Time, and the Armed Forces Radio Service will short-wave it to fighting men all over the world.

Material recorded on actual missions will be brought to New York by plane and delivered to Station WJZ for broadcasting. From time to time the progress of air battles in various theaters of operations will be reported by top rank generals of the AAF. General Arnold or a member of his staff, speaking from Washington, will bring a weekly report from the War Department. The program for the AAF is supervised by Maj. Frederick Brisson. Music will be provided by the AAF orchestra and soldier chorus. T/Sgt. Warren Lewis will write the script of the show.

Changes in Command

Maj. Gen. Ralph Royce, from commander of the First Tactical Air Force (Provisional) to commander of the Personnel Distribution Command.

Maj. Gen. Robert M. Webster, from deputy commander, 12th Air Force, to commander of the 1st Tactical Air Force (Provisional).

Brig. Gen. Paul B. Wurtsmith, from commander of the Fifth Fighter Command to commander of the 13th Air Force.

Brig. Gen. Eugene H. Beebe, to assistant to the Commanding General, Army Air Forces.

Brig. Gen. John F. McBlain, from commander of the 3rd Tactical Air Command

PARACHUTES LOST

38- 10381	42-151928I	42-202748A
42- 4180F	42-162099D	42-210115I
42- 47096I	42-196159B	42-227363G
42- 8097E	42-196160B	42-471750H
42- 9258B	42-196163B	42-649724I
42-104293C	42-196165B	42-649777I
42-106208C	42-196170B	42-649790I

Return to field indicated by letter after number as keyed below

A—Barksdale Field, La.
B—Lake Charles Army Air Field, Lake Charles, La.
C—Louisville Modification Center Control Office, Ferrying Division, ATC, Consolidated-Vultee, Louisville, Ky.
D—Yuma Army Air Field, Yuma, Ariz.
E—Gunter Field, Montgomery, Ala.
F—Moody Field, Valdosta, Ga.
G—Muskogee Army Air Field, Muskogee, Okla.
H—Ogden Air Technical Service Command, Hill Field, Ogden, Utah
I—Lockbourne Army Air Base, Columbus 17, Ohio

HOW SHARP ARE YOU?

QUESTIONS

In answering these questions, count the plane nearest you as number one.

1. Which plane is lagging behind the others?
2. How many wing tanks are visible on the first two planes?
3. What type fighter is the fourth plane?
4. Which plane has a name and what is it?
5. What letters appear on the fourth plane?
6. What parts of the first plane are checkered?
7. Which plane has a letter on its tail and what is it?
8. What letters appear on the side of the fuselage of the third plane?
9. How many AAF insignia are visible in the photo?
10. The first plane has a black band around its nose. True or false.

ANSWERS ON PAGE 57

to Chief of Staff of the Eastern Flying Training Command.

Brig. Gen. Hume Peabody, from director of post-hostilities planning, USSTAF, to commander of Eastern Flying Training Command.

Keep Gloves On

During combat at extremely high altitude an excited gunner may remove a glove in spite of the intense cold to work on a jammed gun. Frostbite is the inevitable consequence, and he may be hospitalized for months and crippled for life.

The cause and effect of such frostbite is vividly shown in a new full color poster produced by Training Aids Division in cooperation with the Air Surgeon, the Aero Medical Laboratory and the 8th Air Force.

The poster test states that practice in clearing a gun with gloved hands while on the ground will eliminate the need to take off gloves while in high altitude combat. ☆

AIR FORCE Now Available by Subscription

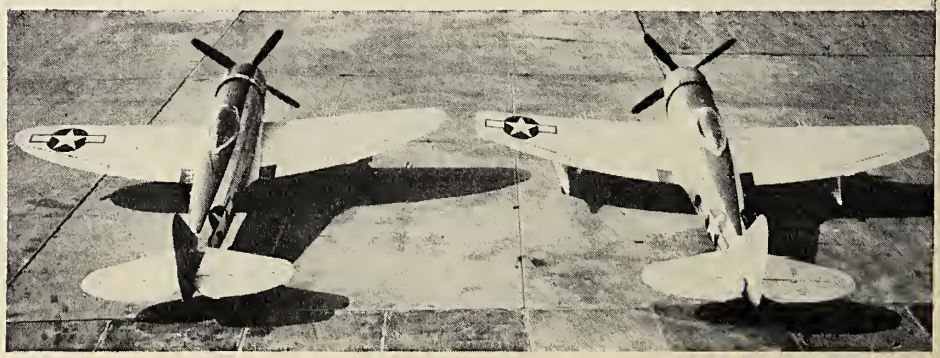
Because of the many requests for personal copies of AIR FORCE, the official service journal now is available by subscription. The present system of bulk distribution to all AAF units, which provides that each copy of AIR FORCE be shared with several readers, will be continued without change. In addition, you now can receive personal copies of AIR FORCE at your Army address or have them sent to your home. The personal copies may be obtained by writing direct to the Superintendent of Documents, Government Printing Office, Washington 25, D. C. The subscription rate for 12 monthly issues is $2.00; single copies, 20c. The same rates apply to APO or Fleet Post Office addresses. Remittances must accompany all orders.

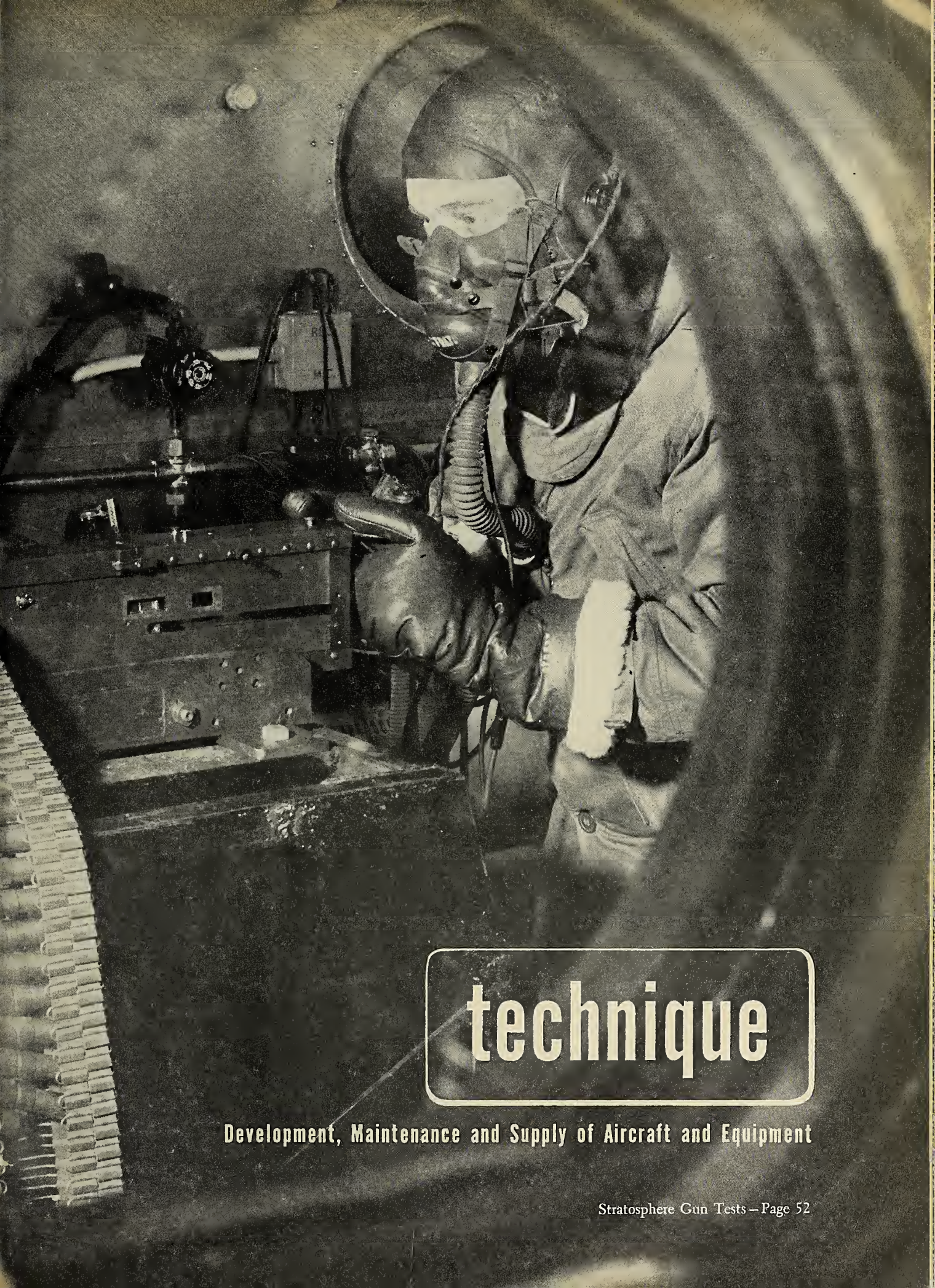
AAF QUIZ

WHAT'S YOUR AIR FORCE I.Q.?

Here is your monthly brain-twister. Chalk up five points for each correct answer. A score of 90 or above is excellent; 75 to 85, good; 60 to 70, not too bad; below 60, tsk, tsk. Answers on Page 60.

1. The AAF guarantees that returnees will be given station assignments near their homes.
   A. True B. False
2. Stalag Luft is German name for
   A. Basic training station for pilots
   B. Supreme War Council
   E. A senior pilot
   D. Prisoner of war camp for airmen
3. You would find a rhumb line on a
   A. Astrodome
   B. Weather map
   C. B-17 instrument panel
   D. B-29 nose wheel
4. Wideawake Field is located
   A. On Ascension Island
   B. At Sleepy Hollow, N. Y.
   C. Near Orlando, Fla.
   D. In the Philippines
5. The American 120 mm antiaircraft gun weighs approximately:
   A. Two tons C. 31 tons
   B. Three tons D. 12 tons
6. Whenever possible, you should make a parachute landing with your back to the wind.
   A. True B. False
7. Approximately how many islands make up the Philippines?
   A. 27 B. 7,000 C. 4,500 D. 225
8. Japanese paratroops were dropped on 5th Air Force installations on Leyte last December by
   A. Dinahs D. Zekes
   B. Nicks C. Topsys
9. Distinguished Unit Citation is the name of an award made
   A. Only to Army units
   B. To both Navy and Army units
   C. Only to AAF units
   D. Only to Navy units
10. Name the only AAF three-place fighter plane in combat service.
11. The Aeronautical Board is
    A. The AAF committee which passes on aeronautical ratings.
    B. The AAF's chief testing organization at Eglin Field
    C. A joint board to effect cooperation between the Army and Navy in the development of aviation.
    D. The civilian research committee of the Association of Aircraft Manufacturers.
12. Normal gravity force on the human body is expressed as
    A. GF B. Plus 1G C. Plus 2G D. GI
13. On what island is Tokyo located
    A. Shikoku C. Hokkaido
    B. Kyushu D. Honshu
14. The name popularly given to the P-80 is the
    A. Airacomet C. Shooting Star
    B. Airflare D. Ascender
15. Headquarters, 14th Air Force is located at
    A. Hengyang C. Chungking
    B. Kunming D. Lashio
16. The Jap Nick is a
    A. Single-engine single-place fighter
    B. Twin-engine single-place fighter
    C. Twin-engine twin-place bomber
    D. Twin-engine twin-place fighter
17. "Synoptic climatology" refers to
    A. Medical research on improved methods of vision
    B. A method of determining the altitude of mountains
    C. Weather investigation and forecasting
    D. The effects of rain upon the soil
18. Initials AACS refer to what?
19. Approximately what is the higest altitude ever reached by man?
    A. 72,000 feet C. 61,000 feet
    B. 100,000 feet D. 58,000 feet
20. Which of the P-47s below is the newer model? ↓



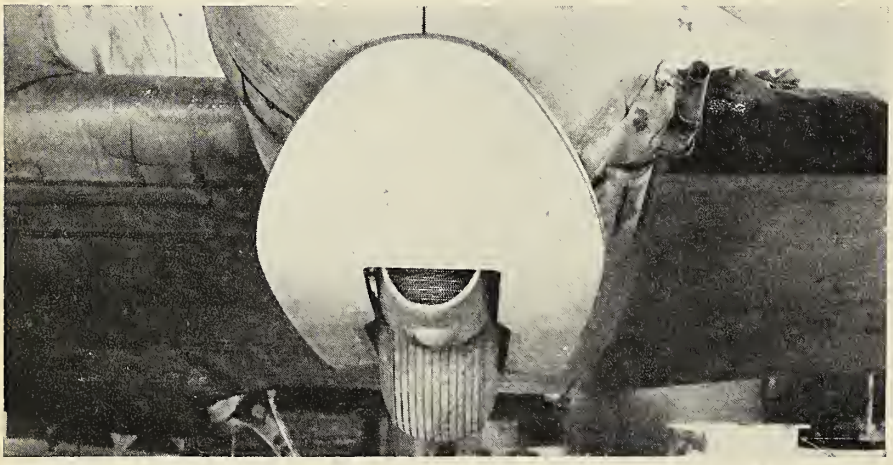


technique

Development, Maintenance and Supply of Aircraft and Equipment

Stratosphere Gun Tests – Page 52

Training plane with fixed landing gear.



With skis mounted on its landing gear (shown retracted) a C47 can land in snow.

Wheels fold into fuselage on XO-52.

Landing Gear Developments

Because landing gear is dead weight when a plane is in flight, designers have concentrated on light and simple undercarriage installations. To eliminate drag they have devised various methods of covering them with "spats" and "pants" and retracting the gear into wings, nacelles and fuselages. Even the 96-inch diameter wheels of the XB-19, weighing 2,700 lbs. each, are retracted hydraulically into huge wing wells.

However, designers have tried to shy away from large wheels because of production difficulties. In the B-29 and C-54, dual-wheel installation are used. This permits use of two small wheels on each landing strut instead of one large wheel. On the Superfort, wheel diameter is the same as on the B-17. Other experimental installations include a large float-wheel gear for the C-47, seaplane floats for all light planes, ski installations on conventional gear and use of tractor treads on an A-20.

The next step may see the elimination on some planes of ordinary landing gear, and such aircraft may skid across sod fields on flattened bellies and special sled-nosed nacelles. Most early planes had fixed landing gear, and the fuselage was practically on stilts to keep the nose high enough for propeller clearance. But with the elimination of propellers on jet-propelled planes, such considerations will not necessarily apply.

An early attempt at wheel retraction was on a Dayton-Wright Racer in 1918. The pilot cranked the wheels up by hand and drag was greatly reduced. Wheel spats and pants which put wheels in streamlined cowlings to cut down resistance were the fad in the Lindbergh era, but mechanical systems of retraction were a progressive step forward. These methods grew in importance as airplanes were cleaned up aerodynamically and landing gear drag became more and more a detriment to speed and performance. When the gear of a B-29 is down, for example, it means a 50 mph differential at 30,000 feet. The C-46 at sea level loses 35 mph when its gear is lowered, and the P-38 sacrifices as much as 100 mph with gear extended. The most important problem in flight with gear retracted is the dead weight that must

This P-39F has tricycle landing wheels.

be carried, and the space that is sacrificed to house wheels and retracting mechanisms in the wing or fuselage.

Depending on the configuration of the airplane, retracting methods differ. Two systems are in predominant use—hydraulic and electro-mechanical. Comparative weights of these systems vary according to the airplane on which they are used. The B-17 electrical system weighs about 290 lbs. less than the hydraulic system of the B-24, but both raise and lower the gear in about the same length of time—40 seconds to lift the wheels and 30 seconds to lower them.

Just where the wheels go, how they pull up and tuck away, also depends on specific airplane designs. The B-17 and the B-29 have large inboard nacelles so wheels retract into them with a knee-action. On the B-24, the wheels fold flaplike into deep wells in the wing's thick center section. Because of thin airfoil sections on fighter planes, wheels must be folded flat into the wings.

Finding a place to "hide" a nose-wheel in single-engine airplanes held back development of the tricycle landing gear, which has definite advantages over conventional types. It puts the nose of the airplane closer to the ground, permitting better pilot vision, improves steerability and tends to stabilize the plane against ground-looping.

Both tricycle and earlier-type retractable gear use hydraulic braking systems which will stop our heaviest planes after a landing run of one-third mile. On planes larger than the B-29, shock absorbers will be called upon to withstand impact loads of 300,000 lbs.

Oxygen Under Water

One day last Fall, Capt. W. C. Kulesz of Wright Field's Aero-Medical Laboratory clamped on a standard A-14 oxygen mask, tucked the small walk-around bottle under his arm and completely submerged himself in the officers' swimming pool at Patterson Field. Because of water pressure, the mask sealed tightly to his face to prevent leakage and he was able to stay under at a depth of four feet for five minutes, breathing normally with no ill effects.

The point Captain Kulesz successfully demonstrated was that ordinary demand-type oxygen equipment could be used in exceptional emergencies to save airmen's lives when planes are submerged in ditch landings and do not sink too far below the surface. In a subsequent test, a mock-up wooden fuselage section of a B-24, complete with escape hatches, was dunked in a

tech topics . . . about aircraft and equipment

A jettisonable plastic cover that fits over B-29 sighting blisters keeps off mud and dirt during take-offs from wet fields. Gunners no longer need look through splotched sighting windows which hindered visibility. The guards also serve to prevent heat distortion when the plane is on the ground in extremely hot climates.

To aid in air evacuation, the CG-4A gliders may be fitted with removable litter installations. Similar litters also may be built in CG-15 gliders.

Recently, a pilot flying the P-59 during a heavy rain squall, reported he got "automatic water injection" in the jet engines. Now, experiments are under way to see if a simple sprinkler system can't be used to increase the power of the Airacomet.

Latest B-17s have enlarged life raft compartments which permit stowage of emergency accessories with the rubber boat instead of separately in the radio compartment. Formerly, the much-needed accessories, which were not ejected simultaneously with the raft, were lost when the fuselage sank. Now the emergency accessories pop out when the raft is released.

During 1944, ATSC's Engineering Division released to standard 480 items, ranging from complete airplanes to a pair of heated goggles. This year, the division is engaged in more than 2,000 different projects.

To make it more comfortable for airborne wounded returning to domestic care, a perfumed deodorant is being tested to rid evacuation planes of their "hospital smell."

Reports from the South Pacific show that long-range fighter pilots are suffering from high temperatures in cockpits due to solar radiation. As a result, plexiglas canopies are being rendered opaque to ultra-violet and infra-red rays. New light-weight clothing and helmets—some made of highly porous fabrics—are also being tested.

Design of a "replaceable nose" for one of our latest and fastest fighter planes permits the plane to be converted into a high-altitude reconnaissance plane in a matter of minutes. Simply by removing four bolts and several electrical fittings, the nose with the guns is replaced by the nose with the cameras.

AAF personnel in far-off places will get their ice cream rations, now that 600 portable-by-air ice cream making machines are on their way overseas. Knock-down soda fountains that can be carried by a C-47 are the next step.

The XR-6 helicopter is now being used as an aerial delivery aircraft. All-wood blades on this craft are now under test at Wright Field, which may eliminate dangers and serious effects caused by hailstones and heavy rain against present fabric-covered rotors.

A quick-packing 18-foot rayon cargo parachute has been designed for dropping supplies in the CBI area. It folds into a 10-inch square, one-piece pack and permits dropping cargo packages weighing up to 200 pounds.

Special bomb-racks in Superforts now permit carrying triple the load of 100-lb. bombs of any AAF bomber. Other armament improvements in heavy bombers include new dual-gun mounts which permit use of the latest K-13 sight, which gives a gunner more automatic aiming devices.

Latest type superchargers have increased the ceiling of P-47s and P-61s by more than 5,000 feet. These same "breathers" on the B-29 will increase its ceiling and cruising range proportionately.

A pulsating seat cushion that "massages" the derriére of seated pilots has been suggested as a comforting aid for flyers on long-range fighter missions. Mittens made of coarse mesh are under test for crewmen who must work in cold climates, since they permit easy grasp of cold objects.

The latest flak helmet has hinged ear-flaps which give protection to a greater area of the head. Helmet is made of .050-inch steel covered with leather padding.

To train aircrews in proper escape techniques under high G forces which occur during spinning, a wood fuselage section with escape hatches has been built on one end of the centrifuge at Wright Field. Whirling to get the simulated spin forces, the trainees are conditioned gradually to the effects of crawling through the hatches.

With standard oxygen mask, and walk-around bottle under arm, airman may breathe under water during emergency ditching.

nearby lake. The six-man crew—Captain Kulesz and five enlisted men—were seated in their proper positions for ditching, and only underwater escape was possible for the individuals in the waist section. With their masks on, they found breathing possible, and felt their way through the water-filled fuselage and climbed to the surface.

Sometime later, AAF flight engineers in experiments at the Navy Yard diving pool, Washington, found that with the A-14 demand mask, the A-13 oxygen regulator and the D-2 walk-around cylinder, a man could stay under water for six minutes in ten feet, for five minutes in 20-25 feet and for 3½ minutes at a depth of 50 feet.

As indicated, the duration of the oxygen supply is affected by water depth, decreasing proportionately as depth is increased. This means that although efficiency of the oxygen equipment under water may be relied on, it is no less important to escape from ditched aircraft in the greatest possible hurry, and aircrews must still be proficient in getting out within a very few seconds. In moving about, extreme care must be taken not to let the hose of the mask catch on trappings in the plane, and because the low-pressure oxygen bottle has enough buoyancy to keep a man afloat, structural members of the plane should be gripped to prevent heads from being cracked against the top of the fuselage.

A small sling that fits over the shoulder like a Sam Browne belt can be used to hold the oxygen bottle under the user's armpit so it is somewhat out of the way, while two waist straps from the sling secure the cylinder so it will not come loose. When held at a level lower than the face mask, the regulator provides a continuous flow of oxygen, and automatically feeds proper quantities in the same manner as when used at high altitudes.

A new walk-around assembly, installed in production aircraft as of April, 1945, consists of an A-15 diluter demand regulator and an A-6 cylinder, which may be utilized for underwater emergencies by holding the palm of the hand over the air diluter. Though some water may enter the regulator through this port, the quantity will not be sufficient to prevent the assembly's use during the first critical few minutes. Action, however, is being taken by the Aero Medical Laboratory to eliminate such leakage, as well as to provide a greater flow of oxygen, since at present the oxygen metering port in the regulator is controlled by an aneroid and is partially closed at ground level.

If walk-around cylinders are not available, standard type A-12 and AN 6004-1 diluter demand regulators installed in the airplane may be used. With the diluter control turned to the "off" (100 percent oxygen) position and the emergency valve open, the submerged man is supplied with enough oxygen to permit him to release other equipment and move to the nearest hatch. He then can effect an escape by holding his breath and disconnecting from the oxygen supply, a method that lends itself well for fighters.

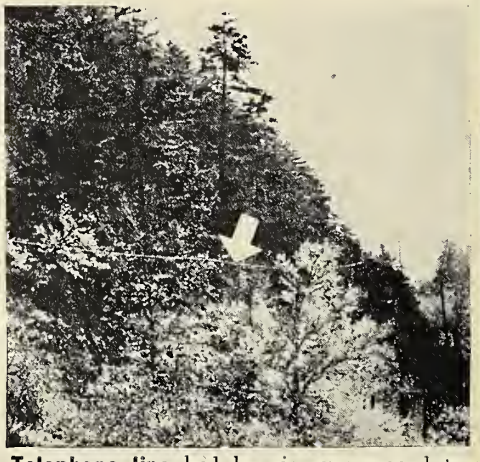
Aerial Wire Layer

Flying low over the rugged Great Smoky mountain region in Tennessee last October, a C-47 laid a two-way, 16-mile long telephone line in less than seven minutes. A ground unit, using standard wire-laying equipment over the same difficult terrain, would have required three weeks.

Within two and one-half minutes after the C-47 began its wire-laying run, men in the plane were talking to ground personnel through ordinary field telephone sets. Four minutes later, when the last of the wire had been laid, a ground patrol began cutting in on the line and was in immediate communication with its headquarters 16 miles away.

Although tests are still being made, it is likely that the AAF will soon be laying telephone wires on top of jungle roofs or stringing them between mountains high above valley floors where the vital cables would be extremely difficult for enemy wire-cutting patrols to see or reach. In airborne operations, similar to the Wingate-Coehran occupation of northern Burma airstrips last year, airplanes may be able to link together, by telephone, all advanced units with their headquarters almost immediately after initial landings.

The installation used on the C-47 weighs about 3,500 pounds and is known as the Center-Guide Wire-Laying System. It consists of a series of box-like containers each of which holds more than 5,000 feet of coiled wire. A three-foot standard pilot chute drags the wire out of its containers and a 20-pound chain weight on the end of



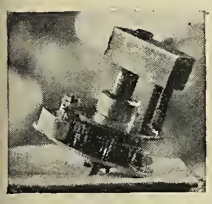
Telephone line laid by air over rugged terrain speeds communication between advance units and headquarters in ground fighting. At right, man prepares to drop plummet chain which will start wire through cargo door guide tube at the rate of 220 feet per second.

the wire makes it plummet straight to the ground. A long tube, eight inches in diameter, guides the wire from the containers through the cargo door, preventing tangling and looping inside the fuselage. This apparatus, which unravels the cable like a ball of twine at an average rate of 220 feet per second, was developed by engineers of ATSC Equipment Laboratory and Bell Telephone Labs after extensive tests.

Another wire-laying system, developed jointly by the AAF and the Signal Corps, makes use of a series of lightweight high-speed coils in a container-dispenser mounted under each wing of an L-5, and permits two double-wire circuits up to five miles long each, to be laid simultaneously.

Bomb Fuzing in Philippines

The battle of the Philippine Islands has been fought largely with two bombs—the parafrag and parademo. In adapting these bombs to the low level style of bombing favored by tactical units of the 5th Air Force, it was necessary to lower the arming time of the fuze from 2½ seconds to 1½ seconds, permitting bombing from 60 feet.



Clock mechanism of M-120 nose fuze on parachute bomb, with a key lock device made in field.

Since factory modifications were not available, ordnance units of the 5th Air Force Service Command were assigned the task of modifying these fuzes in the field by hand. Production-line methods were put into effect and the work proceeded on an around - the - clock basis. In the two-day period prior to the mass air strikes which preceded the Lingayen landings, 10,000 fuzes were produced in the Leyte area alone. One unit modified nearly 50,000 fuzes in 21 days, using three 9-man shifts.

After the modification, timing mechanism is reinserted in the fuze case for bombing.

Chrome Plating for Cylinders

A new chrome plating process at AAF depots increases cylinder life more than 100 percent and eliminates supply and installation problems encountered when oversize pistons and cylinders must be used for overhauled engines. By this means, cylinders headed

maintenance tips . . .

from the crew chief's stand

While plenty potent in the air, the P-47N needs special care when it's down to earth. As mentioned in last month's Technique, tires are slightly larger than those on previous Thunderbolt models, being 34 x 9.9. If tires having nylon fabric are used, all wing tanks can be filled, but if rayon is employed wing tanks must not be filled because of the extra stretch under the greater weight. And watch the clearance between the down lock arm on the landing gear strut and the shim block against which it comes to rest—too little clearance can crack off the arm when the gear is extended. Also, with new type "E" struts, the down latch timing valve is eliminated, and the latch is withdrawn simultaneously with gear retraction. Too little clearance can jam the latch and keep the gear down.

Another sky scourge that requires a little more coddling on the ground, is the A-26. When leading it by the nose via tractor and tow bar, be sure to push the snubber locking pin all the way back to disengage it from the locking notch and allow full turning of the nose wheel. Then, too, make sure the nose strut isn't over-inflated, as this may result in undue wear on the cam and follower. Forgetting to do this will mean one sheared pin after another.

Although the wing skin is stronger on this plane than on the old A-20, the

smoothly finished laminar flow wing is far more sensitive to damage or change in contour—so go easy with your size elevens and with the gas hose.

Excessive ring cowl failure on B-25Js is to be remedied in production, but the condition will have to be corrected in current service models. The modification consists of a stainless steel ring in the cowl leading edge to pick up the foremost rivets of the cowl attaching brackets, which are also to be reinforced with stainless steel angles. A Tech Order will be issued soon to include drawings and procedure.

The engine-to-cowl link assembly has also been changed in production to incorporate a case-hardened bushing and a chrome-plated spacer. All brackets joining links to rocker boxes are to be held to a tolerance of plus 1/32" and minus .000" between inside faces of channel sections. Pending delivery of new assemblies, it is recommended that old spacers be replaced with flanged bushings of rod-oilite bronze, or Z4130 chrome molybdenum. Since no TO will be issued, see sketch in UR Digest 00-65-24, page 21AC.

The enemy won't suffer from lead poisoning if you slosh oil around machine guns while the G-9 solenoid is in place, thus causing congealing and failure to fire at high altitudes and low temperatures. One of the most widely used electrical items

in armament, the G-9 is thoroughly reliable if kept clean—yet there were 538 failures reported in a two-week period because units had been cleaning and oiling gun receivers in the shop without first removing solenoids. In some installations, as with the tilted gun in P-51 wings, the solenoid lies underneath the receiver, where special care must be taken to keep oil out of the interior. For proper cleaning procedure, see TO 00-65-2.

Malfunctioning of bomb doors on B-17s has nearly always been due to improper adjustment of door limit switches. When limits are not sufficient to allow for overtravel on the retracting screws at full open and closed positions, too great a strain is set up on the bomb door shaft, causing breakage. The shaft in question (Part No. 43-785-401) is being made stronger in production, but can be beefed up in the field by pressing on a steel sleeve, 1-inch long, 1/16-inch wall thickness, machined for a snug fit and heat-treated to withstand 150,000 lbs. per square inch.

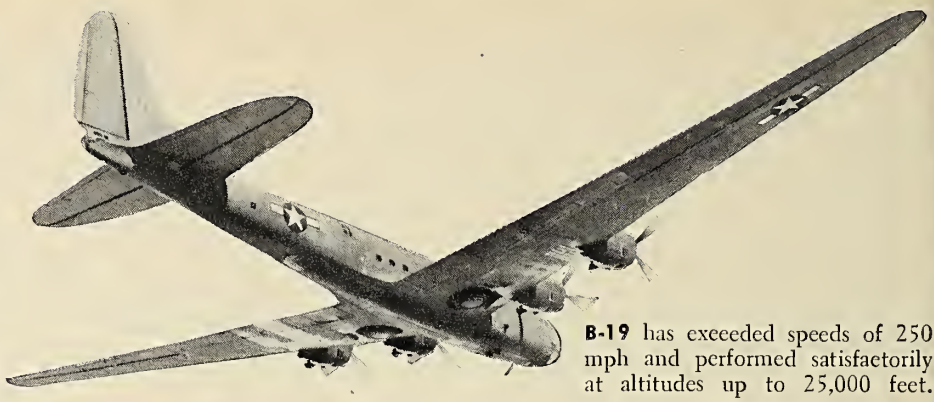
Say "Ah," to a practical suggestion from M/Sgt. Louis Stephenson, 12th Air Force, who found that by using a doctor's applicator or swab stick he could cure small screws of recalcitrant tendencies when they are started in inaccessible places. Trim the end to fit tightly into the screw head slot, start the screw in and then pull the stick away. The same trick can be applied on removal, preserving fingers, screws and pleasant dispositions.

for salvage are electro-plated with porous chromium and are then honed to original specification tolerances. In this way they are able to last for three or four more overhaul periods.

Originally adopted for Lycoming R-680 cylinders, which have relatively soft steel cylinder walls, and Wright R-1820s, which have nitrided barrels that cannot be honed to oversize, the process proved so successful that its use has been extended to Wright R-2600s and P&W R-985s, R-1340s, and R-1830s. More than 4,000 engines of these types have been assembled with plated cylinders at domestic overhaul bases and cylinders now are being plated at a rate approximating 10,000 per month.

The method was developed jointly by engineers of the Maintenance Division and Power Plant Laboratory of ATSC, and was first used in November, 1943 to reclaim worn-out cylinders. At present, chrome-plating is standard procedure at San Antonio's overhaul depot and at many shops doing contract work for the AAF. As additional facilities are made available, and as chromium supplies are increased, the plating process probably will be adopted at all overhaul depots.

When engines with chrome-plated cylinders are sent to depots for subsequent overhauls, personnel should be cautioned not to hone the cylinders and not to use chromium rings, since stock rings are satisfactory.



B-19 has exceeded speeds of 250 mph and performed satisfactorily at altitudes up to 25,000 feet.

B-19 Cargo Carrier

Although the huge XB-19A has never dropped a bomb on enemy territory or fired a gun in combat, it has contributed much to the war effort by providing important engineering and flight data for big bombers, and at present is entering a new phase of its military career as the largest cargo carrying airplane in the world.

Characteristics include a wingspread of 212 feet and a fuselage 132 feet long. From the ground to the top of its tail it is 42 feet high, and the two main landing wheels are eight feet in diameter. Now powered with four liquid-cooled Allison V-3420 in-line engines, each developing 2,600 horsepower, the plane has been equipped with 18 feet, 2 inch props.

As a cargo carrier, the plane has tie-down racks, a new reinforced floor, a large cargo door and a loading ramp. Engineers estimate that 45,000 pounds payload can be readily accommodated, varying with length of flights.

An outstanding feature of the XB-19A is the ease with which it may be handled. Test pilots who have flown it for the last three years point to such advantages as its booster control system and supplementary "flying tabs." Automatic synchronization of the four propellers and the reverse pitch of inboard props, are also contributing factors to its success as a long-haul supply plane.

Front Seat for Navigators

A modified nose section, featuring a remote-controlled reflector gun sight, is providing a front seat and unlimited visibility for lead navigators and bombardiers at a B-24 heavy bombardment wing of the 15th Air Force in Italy. The modification increases visibility approximately 300 percent for these two

what's wrong with this picture?

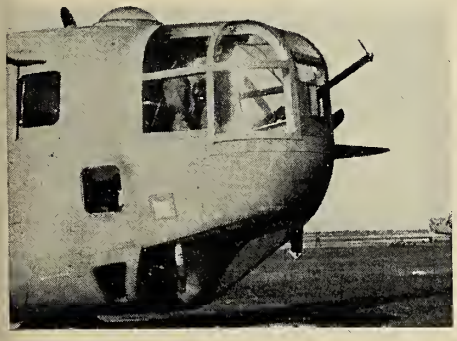
"Good to the last drop" may describe a reliable parachute, but these four right guys doing seven wrong things to their best friends have obviously never studied up on the proper way to adjust, wear and handle 'chutes. Before jumping to Page 56, however, for a listing of their abuses, pull the rip-cord on your powers of observation and you might find a free fall or two. Participants are (left to right) S/Sgt. Joseph Smith, Sgt. Richard Wetmore, Sgt. Robert Folger and Pvt. Edward Graber, all of the 4000th AAFBU, Wright Field, Dayton, Ohio.

vital aircrew members and enables them to work in closer conjunction with one another.

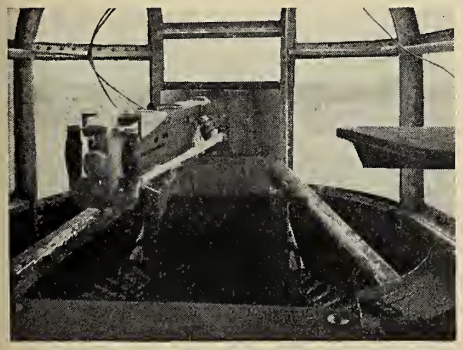
In modifying the Liberator, the nose turret was removed and a section was installed which was then double-decked and encased in plexiglas. The turret gun was taken out and replaced by a flexible .50 caliber machine gun to be handled by the navigator in addition to his regular duties. Other furnishings include a seat, a work table and a horseshoe-shaped footrest located so as not to obscure the navigator's downward vision.

The system of sighting the gun from the navigator's position is an innovation devised by personnel of the wing which initiated the modification. A cable-driven N-8 reflector sight is used with K-7 gun mounts, with reference for the sight being taken from the exact pivotal point of the gun. Gearing and spline shafts were taken from a K-13 shaft to provide mobility for the sight, which moves in elevation and azimuth corresponding to the movement of the gun. The ammunition feed employs a flexible chute, and a booster motor runs from a box mounted in the central position of the nose.

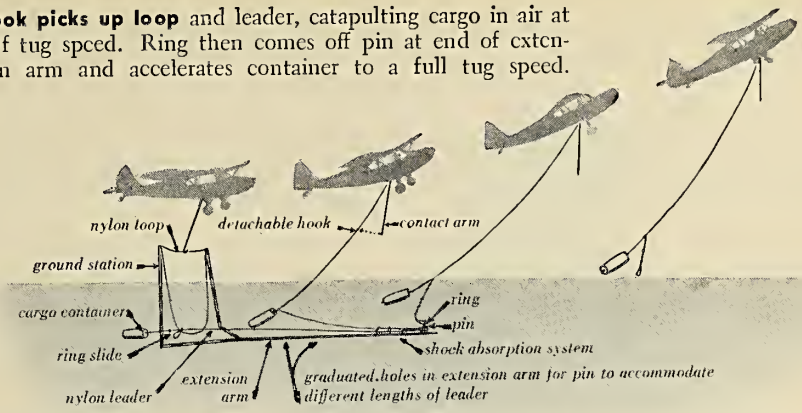
Instrumental in effecting the change —which at present is restricted to lead planes only—were Brig. Gen. Hugo P. Rush, in command of the wing, and Capt. Allen C. Hart and 1st Lt. William S. Matthews, Jr.



Modification to lead B-24s in Italy gives navigator front seat. Interior view (below) shows work table and space for instruments.



Hook picks up loop and leader, catapulting cargo in air at half tug speed. Ring then comes off pin at end of extension arm and accelerates container to a full tug speed.



Liaison Plane Pick-Up

A new, two-stage pick-up system that enables L-type "grasshopper" planes to snatch up 100-pound cargo packets from isolated ground units has been developed by ATSC's Equipment Laboratory to eliminate the bulky reel used by planes for glider pick-ups.

The equipment includes a hook on the end of a springy nylon rope attached directly to the airplane fuselage, a conventional double-pole ground assembly and an arrangement of valve springs and wooden buffer blocks.

As the liaison plane approaches, the pick-up line hooks onto the large nylon loop held between the two ground poles. The ground loop is jerked taut, catapulting the cargo container forward along a guideline at one-half its tug speed. Springs and buffers at the end of the line throw the cargo packet free of the ground, increasing its upward surge to full tug speed, thus resulting in two stages of acceleration. Once the cargo is lifted from the ground it can be pulled into the airplane by hand. Lightweight winches, however, are being devised for reeling in the heavy packets.

Although at present limited to L-type planes and loads up to 100 lbs., experiments are being conducted to apply the device to larger planes which can pick up heavier weights — depending on the strength of the nylon rope used.

Flying a Wing

In the CBI area, where limitations on land transport of spare parts and supplies has forced the AAF to carry everything to China by air, complete wings are frequently lashed to the underside of C-47s and flown over the hump. This expedient requires secure fastening devices and a means of jettisoning in an emergency—both of which have been designed by Mobile, Ala., and Louisville, Ky. Air Depots.

Use of glider tow cable release attachments permit the pilot to drop the wing panel if necessary, while another automatic release device compensates for failure of either fore or aft fastening by freeing the wing when a pull of more than 15 pounds by the partly released section trips the remaining cable.

A fairing over the wing root end reduces drag to about that of an empty towed glider.

Magnesium in Aircraft

In view of a possible shortage of aluminum within a few years at the present rate of bauxite consumption, the use of magnesium—sixth most abundant element in the earth's crust—is being continually increased in more and more airframe and engine parts. Because it is half again as light as most aluminum alloys while possessing equal strength, and because it is malleable, ductile and easily machined, this bluish-white metal has been found to be a particularly well-adapted substitute for critical Dural. New production methods, increased demand for application to jet engines, and tests which have

Slung under fuselage of C-47, this spare wing is flown over the hump to China where it will expedite repair of AAF planes. Panel may be dropped if necessary.

Growing application of magnesium as substitute for Dural is exemplified by P-61 wing tip.

disproved its reputation for inflammable characteristics have all combined to spur its utility.

Already it comprises about 10 percent of the weight of warplane engines, and almost every bomber carries at least half a ton of this relatively new alloy. It is used for crankcases, supercharger housings, blower sections and cylinder head covers on both radial and in-line engines. The B-29's large nose frame and instrument cases, the Black Widow's wing tip skin, the strong substructure I-beams that support flooring of large cargo planes, almost every airplane wheel disc—all of these are now made of magnesium. As applied to jet engines, magnesium is used for "container" parts which are not subjected to high temperatures. Each engine has five large magnesium castings, all weighing under 100 pounds each.

At first glance, the use of magnesium in military planes would seem to be a hazardous undertaking. But recent experiments have established that its igniting temperature is in the same general range as aluminum alloys being used. Magnesium armor plate has been fired at by various caliber shells, including high explosives and incendiaries, and on no occasion did the metal start burning because of the gunfire. In one test, .50 caliber bullets were shot into a magnesium tank containing gasoline and there was no evidence of combustion. In another demonstration, a gasoline tank of magnesium alloy sheet was burned through with a blow torch and the fuel went up in flames and consumed itself—without even melting the tank. In still another experiment, a rocket was set off and allowed to burn inside a magnesium tube, but the metal casing remained intact.

The principal sources of magnesium are sea water and the mineral dolomite. New processes can extract 1,000 pounds from every 100,000 gallons of brine, while dolomite is mined throughout the United States. American magnesium is superior to that produced in Germany and Japan for enemy aircraft, since the domestic product has a very low iron content which gives it greater resistance against corrosion. Production has increased from 3,350 tons in 1939 to 201,804 tons in 1943, although magnesium still costs five cents more per pound than aluminum.

Stratosphere Gun Tests

At Eglin Field, Fla., where the altitude is near sea-level and the temperature is always moderate, the AAF is testing machine guns and cannon at altitudes up to 65,000 feet in temperatures that are 70 degrees below zero. The tests are being run in the Proving Ground Command's new $150,000 high-altitude cold chamber and firing range, which is so strongly built that it will withstand concussion of any gun now used in combat—from a .50 caliber machine gun to a 75 mm cannon.

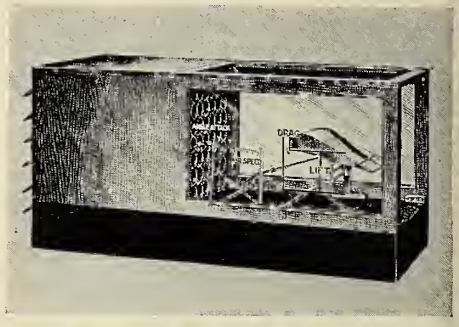
The unit is constructed of heavy steel and comprises four sections—gun chamber, concussion chamber, fan chamber and a shell stop composed of a sturdy concrete sand bin. Thick cork and asbestos line the chambers to provide insulation and fire-proofing, and by separating the firing chamber from the concussion chamber, personnel can fire continuously without exposure to fumes. (See Technique cover.)

Various instruments permit recording of the effects of extreme temperatures and altitudes on rate-of-firing, feeding and operation of all types of aircraft armament. Guns also can be test-fired by remote control from outside the chamber.

New Flight Demonstrator

Without the danger of a stall in an aircraft, students may now actually see in their classroom all of the drama of many fatal low-altitude maneuvers, as well as six other fundamentals of safe flying in three-dimensional form through the use of a model wind tunnel, officially designated as Demonstrator Trainer, Type Q-11.

Housed in a box-like cabinet 20 inches high and 50 inches long, the device consists of an airfoil mounted to move freely in all directions when actuated by an electric fan. Airflow rate and angle of attack are controlled by knobs, and the trailing edge of the airfoil may be moved to illustrate action of ailerons, elevators and flaps. A narrow blue ribbon is attached to the upper camber from the leading edge to the trailing edge to show variations of pressure center at angles of attack.



New training device is in the form of a miniature wind tunnel and illustrates the basic conditions which govern safe flight.

In operation, the apparatus recreates the following major fundamentals of safe flight conditions: stall, lift, proof that total life is produced by the upper camber at zero angle of attack, travel of the chord of the center of pressure in relation to angle of attack, visual illustration of drag and actual degree of drag, use and function of ailerons and purpose and use of brake flaps.

AC/AS, Training, Training Aids Division, has allocated this device only to primary flying schools.

Fighter Bomb Rack

A new electrically operated bomb rack (Type S-1) has been specifically designed to withstand dive bombing pull-outs and has now been standardized for all bomb-carrying fighters.

The rack is made of stainless steel, weighs 6¾ lbs. and is capable of supporting a single 1,600-lb. bomb. Its ultimate load capacity, however, is rated at 19,200 lbs.—the maximum G-force expected of any fighter plane. A 24-volt source insures instant release of the bomb in contrast to previous racks which had a tendency to "hang-up" the missile for fractions of a second after actual release—the result of pull-out forces. When it is necessary to drop bombs without arming them, as emergencies arise, a novel safety device insures positive release of such duds. Similarly, a special arrangement makes positive that bombs are armed.

Minimum installation maintenance is achieved by having only two bolts which hold the rack in its cradle under the fighter's wing.

Skymarker Smoke Bombs

New colored smoke bombs for aerial signalling and visual indication of enemy targets, have been developed for use by the AAF in combat theaters the world over.

Bomb release point marker mounted on B-24 under tail turret and over formation lights. Bevels give corona effect to charge.

In tests at Eglin Field, Fla., the M87 skymarker bomb, perfected by the Technical Command of the Chemical Warfare Service, proved itself satisfactory for use with precision instruments in bombing enemy targets through clouds, smoke screens and other conditions preventing normal sighting. It is a thin-walled bomb containing eight colored smoke grenades set off by a special ignition fuze. While falling toward the enemy installation, the skymarker leaves a bright trail of red or yellow smoke which persists for at least one minute and which is clearly visible

on the line

with mechs around the world

The old heave-ho method of testing a safety belt, using a cumbersome weight and lever arrangement to establish its strength, has been scaled and found wanting by members of an ATC crew at Long Beach, Calif. Most belts are now able to withstand a 1,000-pound pull, but with the device developed by Capt. George Boling of the unit's Ferrying Division, you don't have to be an Army mule. Using salvage materials, he built a frame surmounted by a hydraulic cylinder and pump. With the belt fastened at the base of the frame, the hydraulic apparatus can set up any desired test strain on the belt, limited by a regulator which prevents overloading.

Moving to a new area in the Pacific, a service squadron of the 13th Air Force found itself without portable electric generators for producing power. Undismayed were Sgt. Herman Goldstein, Benton Harbor, Mich., Sgt. Edward Jorgenson, Santa Fe, N. M., and Cpl. Fred Kelly, College Park, Ga. Using the parts of some 16 condemned jeeps, they put together a field power plant, complete with a self starter and a panel for indicator gauges. All service needs were ably met and the work of the squadron was able to continue with only a temporary interruption.

Up in the air, when flak or gun fire severs a bomber's control cables, there is usually very little that can be done to repair them, and in most cases the plane has to be abandoned. To provide an effective remedy for such emergencies, Major Jesse White, Ontario, Calif., and his assistants, S/Sgt. Howard Yancey, Buffalo Junction, Va., Sgt. William Yuran, Billings, Montana and Cpl. John L. Speer, Apollo, Pa., ransacked the scrap piles of the tubing and cable shop of the engineering section at their Air Service Command depot in Italy, and finally came up with a device for repairing control cables while the plane is in flight.

The contrivance requires no tools and consists of two lengths of cable with a turnbuckle in the center. On one cable the male end of the turnbuckle is clamped, while the female end is fastened to the other.

In each of the three holes on the turnbuckle, a 6-penny nail is inserted with its point flattened to prohibit removal or loss. The outside ends of the cable are equipped with a U-bolt clamp with a machined handle. This U-bolt has an ordinary hex nut on one arm but the other nut is on a T-shaped extension to permit tightening by hand without interference.

As used in emergency control cable repair, the severed line is located and the new portion is clamped onto the broken ends with as tight a tension as possible. Then, holding the nails in one hand, the other nails in the turn-buckle are tightened until the correct tension is achieved. Such a procedure can be performed in a few minutes by any member of the crew, and enough cable is carried as standard equipment to enable the splice to be made around pulleys if this procedure should become necessary.

Pin-up planes of the month are "Shoo-Shoo Baby," a 15th Air Force B-24, shown at top with her pilot, Maj. William S. Shoemaker, Kenneth Square, Pa. She was crew chiefed by M/Sgt. Lester Halonen, Milwaukee, on the 510 combat hours she flew before an engine change. Above, "Ish-Tak-Ha-Ba," a 9th Air Force B-26, has rung up 111 missions. Plane's crew chief is T/Sgt. Paul Fast of Liberty, Kansas.

By removing the armament, taking off the rear armor-plate and altering the position of the radio set in war weary P-47s, mechanics at a 9th Air Force Service Command base in France were able to change several of these retired Thunderbolts into two-seater utility planes instead of turning them into scrap piles for spare parts use.

The revamped fighters are used for passenger transport and for combat observation flights, as well as for test purposes in which crew chiefs and mechs are taken up to observe for themselves the reactions and flight characteristics during actual operating conditions of instruments and mechanisms on which they work.

One of the first of these conversions was made by the mobile repair crew of T/Sgt. Thomas W. Haward, Bloomington, Ind. It was flown by test-pilot David W. Wagner of Boulder, Colo.

to planes flying five miles to the rear.

At a B-24 wing headquarters of the 15th Air Force in Italy, the need became apparent for an accurate and instantaneous visual signal for "bombs away" on the lead ship of a box when all bombardiers are toggling on the leader. At the recommendation of Brig. Gen. Hugo P. Rush, wing commander, an effective solution was executed by Major Edward Perry.

Unofficially designated as "Release Point Marker, M-1," the device holds and fires a pyrotechnic charge the moment the indices in the bombsight meet, or upon toggling the bombs from the racks. With the marker in use, the bombardiers are no longer faced with the inevitable time lag between actual release of bombs in the lead plane and their first view of them. If the lead ship fails to drop its bombs due to technical difficulties, the charge will still shoot out, enabling the other planes to let loose with their bombs and eliminating the danger of making a second run over the target.

WHAT'S WRONG with the picture on Page 52

1. Unless the soldier at the left hides the silk, he won't be hitting it. Part of your 'chute showing means that you're harnessed to unserviceable equipment. Check your parachute yourself and turn it back for repacking if it's not all right.

2. The same airman has uneven leg straps. When he fastens them on and then has to jump, he'll get a very one-sided reaction on the opening shock.

3. We know it feels good to sit down once in a while, but a back pack is not a chaise lounge. The man sitting at left is taking a chance on causing defects to fittings and releases by which his life may hang.

4. Contrary to his apparent opinion, 'chutes do not need lubrication. Another inch or so and his pack will be soaked with oil, possible ruining the 'chute itself.

5. An easy-going Joe is the man standing in the center. But when he reaches for the rip cord he'll find that the twisted chest strap has made it almost impossible to pull.

6. Nobody seems concerned about the unassigned parachute under the lower ball turret, but there is always danger of acids or oil dripping down and spoiling both pack and contents.

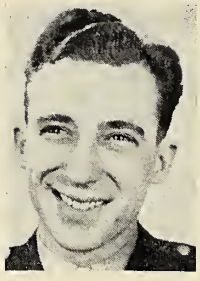
7. The reclining crewmember with the chest-type 'chute is in for a sad awakening, when he finds that the snaps on harness and pack cannot be mated. Be sure that your quick-attachable 'chute has proper snap and ring combination so they can be hooked together.

The Intercom

AIR FORCE presents these answers to its Question of the Month. Replies are those of personnel recently returned from combat duty.

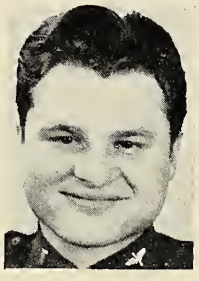
QUESTION: What was the smartest trick you ever saw pulled in combat?

1st. Lt. Roy C. Schmidt, pilot, 8th Air Force: "We had a very long haul to a target deep in Germany. The Nazis threw up a smoke screen and our group was awaiting orders as to whether we should try to hit the original target or go on to the secondary. We got separated from the wing, and suddenly our group leader gave orders to lower the ball turrets. As the turrets went down, we were jumped by a lot of fighters. But they saw the turrets and left without attacking. Our leader must have smelled those fighters—that order was the smartest one I had ever received."



S/Sgt. Vincent Coppola, gunner, 15th Air Force: "I saw a B-24 come in with only one engine—and any pilot that can do that is plenty smart. A group had gone out to bomb oil refineries in southern Italy and we were lined up watching them come in. One Liberator was badly beaten up—it had no tail turret at all and Number 2 and Number 4 engines were out. The pilot had leveled off and was about 200 feet from the ground when he feathered Number 1. Yet he brought that ship in for a perfect landing. It didn't even roll over or leave the runway."

1st. Lt. Hans Rothe, engineering officer, 20th Air Force: "We were ordered to change the oil tanks on our B-29s. Ordinarily, it takes almost a month to make the change but our ground men revised the procedure. Instead of working from the bottom, they took off the nacelle plate from the top, cut through the sheet metal, and pulled the tank out with a hoist. By doing it that way, the whole job was finished in just four days—a typical example of American ingenuity. Now all changes are made that way."



S/Sgt. John Stoddard, gunner, 10th Air Force: "We were bombing some railroad sidings in Burma. We came in at about 190 feet and dropped our entire load. Just then, a land mine went off. Railroad ties, tracks, hunks of boxcars and practically everything else blew up in the pilot's face. At that altitude, I thought we were goners. But our pilot banked sharply and held the plane sure and steady—we didn't even lose 50 feet of altitude. That was the smartest flying I have ever seen and, believe me, it was quite a feat."

S/Sgt. Bertram Hersh, gunner, 12th Air Force: "We were at 12,000 feet over Toulon Harbor on D-day. There was a lot of flak and just when it started to get our range, we suddenly dropped to 7,000 feet. We had been briefed to do that and it certainly fooled the antiaircraft gunners. We had taken a couple of hits at the higher altitude, but at 7,000 feet we were completely free of the flak. We got back without anything happening. I think that was the first time anybody pulled a trick like that."

Sgt. Francis Nelly, radio operator, 10th Air Force: "A Jap plane attacked a C-47 carrying supplies from India into North Burma. But the transport pilot substituted flying ingenuity for his lack of armament. He dove into some clouds right above a mountain and the Jap followed him. Evidently, the C-47 pilot knew the exact altitude of the mountain and the Jap didn't because the transport pulled out just above the top peak and the Jap crashed into it. That was pretty smart flying, just about any way you look at it."

WHEN IN TROUBLE—SOUND OFF

The rescue boys will find you a lot quicker if they know where you go down

All along the line they keep telling you, "If there's a possibility that you're going to crash, give the guys on the ground a chance to find out where you are—transmit for a fix, give a position report, or if you don't feel like talking, just flip the toggle switch marked 'emergency' on your automatic transmitting equipment."

And yet every once in a while there just isn't time for any of this pre-crash etiquette—as crew members of No. 157 found out.

No. 157 was a B-24 with a nine-man crew, and it was practicing emergency procedure recently at 10,500 over a valley 25 miles southeast of Tonopah, Nev. While they were going through three-engine operation with the No. 3 engine feathered, the No. 4 engine sputtered and quit.

The plane swerved suddenly and violently to the right. The pilot instinctively gave her right rudder—apparently with considerable violence, because as he pushed forward with his foot, the seat broke under the strain and he fell backward in a tangle of parachute straps and safety belt.

Now the Lib was really out of hand. The tail began to flutter dangerously and the crew in the back bounced around like dice in a birdcage. The copilot grabbed the controls and chopped throttles on No. 1 and No. 2 engines.

He got the plane under control all right, but not until it was only a few feet above the ground—so low, in fact, that he had to make a wheels-up forced landing.

A little operation like this naturally kept the pilot somewhat busy, but that was no excuse for not ordering the radio operator to send an emergency signal. On the other hand the radio operator could not be expected to send an emergency signal except at the command of the pilot. He probably figured the plane would get out of its difficulties. Anyway, the plane was down in the desert at 1800 hours, and nobody on the ground had the vaguest idea where. Rescue men had no information except that the plane was missing and had been gone long enough to be 600 miles away.

Even so, ground controllers have a few tricks up their sleeves for such emergencies, tricks that have earned their reputation as crash detectives. Back in 4th Air Force's control room, they put the rescue machine into action.

When Tonopah notified the 4th Air Force controller in San Francisco at 1937 hours that they hadn't been able to contact No. 157 since 1720, when it was still over the field, the controller told them to keep trying to establish radio contact and tell the B-24 to turn on its emergency transmitting equipment. If the regular transmitter was out, the controller reasoned, the plane might still receive the message and then it could be located by electronic detectors if it were still in the air.

Next, the controller alerted the Air-Ground Control net. If the B-24 could still transmit, it could be D/F'ed by AGC. Then he called Fresno. At 2049 the emergency rescue officer at the Tonopah field sent out a search plane to check every auxiliary landing strip in the area.

All planes in the air were alerted to look for the lost plane, and even the fighter radio channels were checked. None of this did any good, however, because the plane was already down between two mountains with a broken antenna. So at 2200 No. 157 was declared lost, and the radio stations abandoned their efforts on contact. At this point the Forest Service, the State Highway Patrol and the CAA entered the hunt, but it was too dark to search thoroughly.

Tonopah resumed its own aerial search at 0500 the following morning and at 0745 one of its planes sighted the wreck and reported it by radio. It was only 15 miles southeast of Tonopah, but was almost hidden from view behind a range of mountains. Thirty-three minutes later, ambulances, a doctor and others of the rescue party arrived but only one of the crash victims was hurt and he merely had sustained minor cuts.

Many crews don't get off so easily in a crash, and cases are legion where men's lives hang on immediate rescue and medical aid. It's up to the pilot and radio operators in the plane to let the ground men know where they are. Tell your ground station as soon as the trouble begins—don't wait until it is too late. D/F stations can get a fix on you—in case it turns out a few minutes later that you really need help.

If your trouble disappears, you can always call your controller later and cancel the alert. But play safe,—remember, when in trouble, SOUND OFF! ☆

. . please sir—shall I send an SOS now?"

From "Mayday in Action"—4th Air Force

DROP ON CORREGIDOR

(Continued from Page 10)

underground installations battered to a pulp, the time had come for one of the most difficult operations in airborne military history.

At 0830 on the morning of February 16, a C-47 appeared over the hazy horizon, flying at 1,000 feet. Lt. Col. John Lackey, CO of the 317th Troop Carrier Group, was at the controls and behind him sat 24 hardened veterans of the 503rd Parachute Infantry Regiment. The smoke of the final combined naval and air bombardments still billowed over Corregidor as the C-47 neared "Topside"—a rocky plateau with its two tiny "jump" areas, the largest of which was 1,700 by 700 feet and perilously close to 500-foot sheer cliffs. Eight paratroopers tumbled from the transport.

Other C-47s followed close behind, flying in two strung-out trains. They came in nosed slightly downward on a gentle glide at about 110 miles an hour, a thousand feet above sea level but less than 600 feet above the bomb-shattered terrain. Jumpmasters counted four seconds at the "go-points" before loosing their eight-man "sticks." The areas were so small that to drop nine men at a time would have the last man falling into the bay.

The wind velocity increased and the jumpmasters' counts went up to 10 seconds as the two sky trains passed the dropping area and diverged north and south, swinging in two great counter-rotating circles for their second and third eight-man runs.

For one hour and 20 minutes, 50 C-47s sowed their human cargo on the plateau until the ground was literally blanketed with white parachutes.

All during the paratroop operation, A-20s had made strafing runs over the neck of the chop-shaped island, erecting an effective wall between the main portion of "The Rock," where our men had landed, and the tail of the chop where surviving Japs had formed into a strong pocket.

Paratroopers of the 503rd Regiment alone held Corregidor for 40 minutes, and at 1030 the first waves of landing craft hit the island's only beach. The men walked ashore with their rifles on their backs.

It took some hard, hand-to-hand fighting to dig the Japs out of the holes they had burrowed into, but on March 1, General MacArthur announced that the destruction of the enemy garrison on Corregidor had been completed for all practical purposes. Four thousand, two hundred and fifteen enemy bodies already had been counted while hundreds of others had been sealed in the tunnels and caves of "The Rock." Our losses: 136 killed, 531 wounded, 8 missing. ☆

Answers to "How Sharp Are You?"

on Page 2

1. Third
2. Two
3. P-51 (All four are P-51s)
4. Second
5. H L A
6. Wingtips, tail assembly
7. Third, "Q"
8. WD
9. Six
10. True

RHINELAND RENDEZVOUS

(Continued from Page 28)

mental command post.

Some of the glider pilots were passing through to the evacuation center; all were grimy and tattered; they had seen plenty of action. They were pilots up to the moment they landed. Then they became infantrymen, for it was a case of fight or die. Most of them stayed close to the paratroopers, manning machine guns and joining in the assault against enemy strongholds. One of the pilots was particularly proud. He had fired a bazooka for the first time and had stopped a tank with his opening shot.

At division headquarters we joined up with F/Lt. F. Begillis, a Canadian Spitfire pilot who had just been shot down. He had come over a road to strafe a truck when he noticed it had a Red Cross painted on its side.

"I pulled up and waggled my wings to let them know I wasn't going to shoot," he said. "But they opened up on me with a gun mounted alongside. After this I'm not going to be so kindhearted."

From American headquarters we found our way across the Rhine, and after two days we were back at the 313th Group. It was a grim story that they told us on arrival. The mission had exacted a costly toll. Twenty of the group's C-46s had gone down before the enemy's ground fire. Five others had made emergency landings at other fields. Of those returning, 33 limped back with battle damage.

There was little variance in the tales of returning crews.

"The sky was full of flak," reported 1st Lt. Ernest A. Hammesfahr. "We could smell cordite in the air and we knew that our plane was hit. It began to vibrate, and bits and pieces were breaking loose from the wing. We made an emergency landing just inside friendly territory."

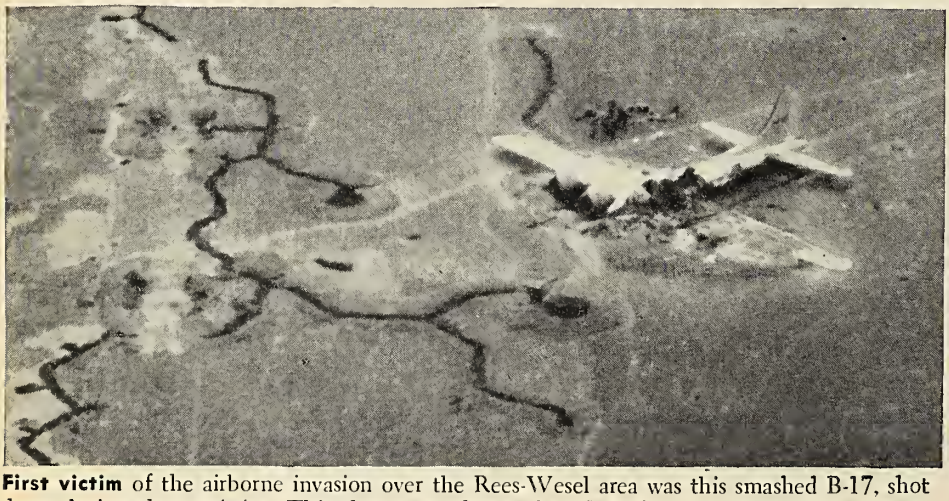
1st Lt. Edward C. Koenig told how his right engine was blown out by a shell just after the last paratrooper had jumped. "Planes were burning and going down all around us," he continued. "We finally picked up enough airspeed to level off, but by then we were right on the deck and that's when we really got it. One shell burst through the plane and we were being peppered by small arms fire. Just as we were about to cross the river, a shell hit our left engine. Then we really became glider pilots. We picked out the nearest field and set her down. We all got out and started running, fearing the plane would explode. Some civilians were shouting at us but we didn't pay any attention. We didn't know we had landed in the middle of a mine field."

The 313th had suffered a punishing blow, but its losses reflected neither on the performance of its aircraft nor on the skill of the pilots and crews. It was simply the turn of chance that its aircraft had passed over the most heavily defended area in the invasion zone. Had the group been assigned a different course or had it reached the target an hour later, the casualties probably would have been negligible. As a whole, the airborne landings were outstandingly successful.

Including the losses of the 313th, the entire operation had cost less than 60 powered transports.

Nearly 98 percent of all parachutists were dropped successfully and the same percentage of all gliders was released at the assigned landing zones. Air cover was so effective that not a single plane or glider was shot down by enemy aircraft. Ground opposition was much more intense than in the Normandy and Holland operations because of the limited area involved in the landings, yet of the more than 2,000 tons of field pieces, supplies and ammunition dropped and landed in the area, very little fell into enemy hands. Well over 90 percent of the bundles dropped by the Liberators was recovered by our troops at troop carrier headquarters.

The operation was hailed as another forward step in airborne operations. It had achieved its objective at minimum price and those who shared in its planning were confident that it would serve as a model for airborne missions of the future. ☆



First victim of the airborne invasion over the Rees-Wesel area was this smashed B-17, shot down during photo mission. This photo was taken by Lt. Neely from IX Troop Carrier plane.

Rendezvous

(Continued from Page 3)

Sackcloth and Ashes

Dear Editor:

Yours is one of the finest magazines on matters pertaining to airplanes and stuff in the business, but after all, to err is only human. After eight long months of "Ready! Now!" instruction in aircraft identification, a mistake like the one in the shots accompanying the article "Isolating the Battlefield" could never escape the sharp-eyed cadets at SAACC. The plane on the top of Page 8 in the March issue is an FW-190 and not an ME-109 or we've been calling them wrong all these months. Maybe you had better call back that excaption writer.

You've still got a lusty vote of confidence from all the eager beavers here, so thanks for your splendid magazine.

Aviation Student Oscar Schmitt,
San Antonio, Texas

Dear Editor:

On Page 8 of your March, 1945 issue, please recheck the photo captioned "Phase 1." If that is an ME-109, I'll eat an aircraft identification book. Five obvious features make it a FW-190. How about that?

Sgt. Russell F. Swartz,
Wright Field, Ohio

Dear Editor:

Mr. Messerschmidt is gonna be awful mad at you for calling that pile of junk, at top of Page 8 in your March issue, one of his junk piles. It is a FW-190 if I ever saw one, (in recognition class).

F/O Robert H. Breen,
Punta Gorda, Fla.

Dear Editor:

Have the Germans begun to use the B.M.W. 801 or 802 series radial engines in the ME-109 as pictured on Page 8 of the March 1945 issue? In most other respects the plane looks like a FW-190.

Thanks for an excellent issue.

Pvt. Lee Whitney,
Pope Field, Ft. Bragg, N. C.

Dear Editor:

If that photograph you call a ME-109 is the real thing, I'll eat the whole magazine.

Bobby Scott, Edna, Texas

Dear Editor:

In your March 1945 issue one of the questions asked about "How Sharp Are You" is, "Where is the helmet of the man bending over the engine?" It is question number four, I think.

Please make the correction that he is not bending over the engine, but is examining or working on the guns. The engines are on either side of the cockpit nacelle.

We might add that AIR FORCE is undoubtedly the best publication in the armed forces or in fact the best of its kind we've ever had the pleasure of reading. Congratulations!

S/Sgt. Wilson J. Peck, Orlando, Fla.

Dear Editor:

If the man with the helmet on is bending over an engine—the "Joe" in front is cleaning out rocket tubes instead of machine guns.—(March issue of AIR FORCE.)

Lt. B. Colabella,
Ellington Field, Texas

Dear Editor:

Are you sure the ex-caption writer is not at large?

That ME-109 on Page 8 is a FW-190.

Sgt. John L. Parcels,
Moody Field, Ga.

Dear Editor:

Since when does a P-38 have three engines? This pertains to the "How Sharp Are You?" questions on Page 45.

T/Sgt. Eugene Knitter,
Chanute Field, Ill.

We were wrong. It was an FW-190. The man with the helmet is bending over the armament compartment of the nose of the pilot's nacelle. We really knew better, and the only gremlin we can blame is carelessness.—Ed.

Postwar Problem

Dear Editor:

Enclosed is a poem by a 10th Air Force sergeant. Although the mysticism of India may have influenced Sergeant Johnson to gaze into the future, his inspiration is strictly GI, his subject meaty.

Capt. Lawrence P. Bachmann
AIR FORCE Correspondent, CBI

An Ode to the Fighting QM

What did you do in the Great War, Pop?
Didja kill any Germans or Japs
Or sink a submarine perhaps?
Didja win any medals shiny with gold
Were you a Marauder, brave and bold?
Didja come home laden with spoils and booty
Gained thru initiative above line of duty?
Didja get any wounds, Pop, show me the scars.
I bet you looked swell with your Captain's bars.
Were you a pilot Pop, skimming the skies
Shooting down Zeros, like swatting flies?
Were you in Burma, with Ghurkas and Sikhs
Lost in the Jungle with no food for weeks?
Were you a hero, Pop, how did it feel
To be the attraction in a Fox News Reel

(Continued on Page 60)

PICTURE CREDITS

FRONT COVER: Eugene Furnish, ATSC. 8: Signal Corps. 18-19: T/Sgt. Carl Gifford, Wright Field. 32-33 and 38: T/Sgt. Roger Coster, AIR FORCE Staff. 37: Chinese News Service from Guillumette. 42: Maj. Herbert O. Johansen, AIR FORCE Staff.

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DODGING FLAK

(Continued from Page 7)

course before another turn would be required. So long as this procedure of flight is followed the chances of being hit are relatively small.

The lead plane must start the turn well before the allotted time for the shells to arrive, so that the entire formation will be out of the way by the time the bursts reach the formation's altitude. Flak gunnery is not 100 percent perfect and errors of 800 to 1,000 feet are common at high altitude. The dispersion volume will be large when fired by several batteries and most bursts will be toward the center.

Hence, the chances of being hit are greatly lessened when flying on the outer edge of the dispersion volume.

PREDICTED CONCENTRATIONS

Less accurate than continuously pointed fire, predicted concentrations appear as a cluster of bursts, all occurring within a few seconds of each other. They are usually concentrated about a point which is again predicted somewhere along the formation's course. Gunners resort to this method of fire when visibility is poor. Under these conditions, if suitable countermeasures are used, it is almost impossible for the enemy to track. Although the gunners cannot track continuously, sound locators, "shadowing" and spotter aircraft are often used to relay to the gun batteries the formation's altitude, speed and direction of flight.

The enemy gunners then fire one or more salvos at a predicted point in space. Each battery fires in advance of the ETA of the formation by the same number of seconds as will be required for the shells to reach the point. Therefore, in this type of fire, several batteries will produce bursts simultaneously.

The fundamental weakness of predicted concentration is that about 90 seconds of predictable flight are required for the first predicted concentration. Following concentrations can be produced about 60 seconds later.

By following the rule of never holding a course for more seconds than altitude in thousands of feet, flyers can make it almost impossible for the gunners to get the course, make their calculations, fire and have the projectiles reach the formation accurately.

BARRAGE FIRE

The most ineffectual type of fire is barrage fire. It is used only when conditions are such that the flak fire control system cannot track the target, or when the central system is damaged or missing. They then resort to other sighting instruments to determine the path of flight. Barrage fire takes the form of a large volume containing intermittent bursts. It stands still, with bursts occurring over a long period of time. Since the gunners cannot predict, they select a volume of sky where they think the formation will level out. They then continue to fire every available gun into the barrage so the formation will be required to fly through the "box" to reach its objective.

It is possible for a flight to go under the "box" and drop its bombs. However, large formations are generally not flexible enough to execute this maneuver.

Some of the more important rules are:

1. Take evasive action up until the start of the bombing run.

2. Make the bombing run as short as bombing accuracy permits.

3. Upon completion of the bombing run resume evasive action and continue it until out of range of enemy flak. (Evasive action at high altitude should be deliberate and irregular rather than quick or violent.)

4. If other bombardment planning considerations permit, keep the time interval between successive bombing units as short as possible.

5. Prediction accuracy begins to decrease rapidly when an airplane travels at high speed or changes altitude at a rapid rate.

6. Heavy flak is much more accurate below 10,000 feet than it is above altitudes of 15,000 or 20,000 feet.

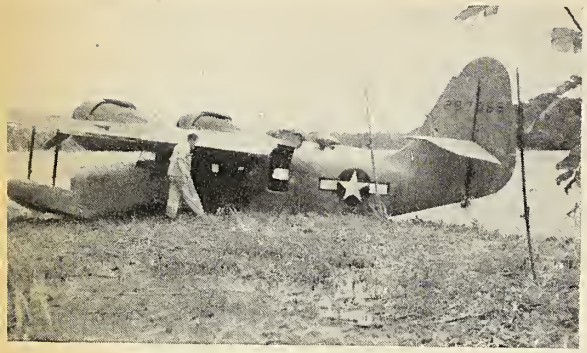
7. On low-level attacks through automatic weapons fire, the best tactics are surprise and speed. Go straight in and straight out—fast and low. Do not climb or resort to evasive action other than for skidding turns. Speed is essential.

Listen to the advice of your flak officer and you'll have a considerably better chance of beating flak—and coming home alive. ☆

Mitchells of the 5th Air Force completely surprise a nest of Jap antiaircraft guns in a low-level attack against Boram Air Field, New Guinea. Several supply dumps were destroyed.

THEY MAP THE WORLD

(Continued from Page 24)



This amphib got its geodets to an otherwise inaccessible jungle area in South America.

Control station, Smith Bay, Alaska. Star fix will be taken with instrument at left.

Geodet party, en route to station, leads jeep and equipment on Chinese river barge.

Local guides are frequently employed by land parties to lead their mapping trips.

distances are great, four-engined aircraft do the job. The latter was the case in June, 1944, when a plane piloted by Lt. Lloyd Vincent made the first photographic reconnaissance of the Kurile Islands from the Aleutians. He got down as far south as the island of Shimushiru, some 500 miles from the home islands of Japan, in a 12-hour flight in a B-24. In these operations, photographs were made for use by the 11th Air Force in its tactical, pin-point bombing.

The photographic mappers fly specially-modified aircraft such as the F-7, F-9, F-10 and F-13. The photographic equipment consists principally of 3K-17 trimetrigon cameras. The trimetrigon system of photography was devised by Col. Minton W. Kaye, former commanding officer of the 1st Mapping Group, and Col. Gerard Fitz Gerald, formerly of the U. S. Geological Survey and a veteran of many Arctic operations.

The 311th is a small army in itself. All operations are temporary duty assignments out of headquarters, Buckley Field, Colo. The planes attached to the wing carry their own specially trained aircrews and ground crews.

Prior to the war, the German General Werner Von Fritsch said, "The military organization with the best aerial photo reconnaissance will win the next war." The topper to that statement is made by Colonel Polifka, who says, "I believe the general was absolutely right; anyone can see who's winning it." ☆

Answers to Quiz on Page 46

1. (B) False
2. (D) Prisoner of war camp for Allied airmen
3. (B) Weather map
4. (A) Ascension
5. (C) 31 tons
6. (A) True
7. (B) 7,000
8. (C) Topsys
9. (A) Only to Army units
10. P-61 Black Widow
11. (C) A joint board to effect cooperation between the Army and Navy in the development of aviation
12. (B) Plus 1G
13. (D) Honshu
14. (C) Shooting Star
15. (B) Kunming
16. (D) Twin-engine twin-place fighter
17. (C) Weather investigation and forecasting
18. Army Airways Communications System
19. (A) 72,000 feet
20. Model N at right

Rendezvous

(Continued from Page 59)

What did you do in the Great War, Pop?

He asked me these questions
Astride of my knee
His eyes bright as diamonds
Sparkling with glee
In anticipation
Of the tale to be told
Of when Pop was a soldier
Strong, brave, and bold,
Just like at the theater
awaiting the curtain
'My Pop is a hero'
Of that he was certain.

I lit up my pipe
Just stalling for time
What should I tell him
This son of mine.

Should I speak of Tarawa, Attu, and Rangoon
Of bloody campaigns in the roaring monsoon
How when wounded and weary I still carried on
And boast of the medals and honors I'd won
Or should I admit the truth like a man?
I issued the Spam in Old Assam.

Sgt. Robert L. Johnson
Staff Quartermaster Section
10th Air Force.

Breaking Records

Dear Editor:

In your November issue I read about a few records that were made with the B-17, B-26 and the B-25, also the Editor challenged anyone to beat them. I for one would like to tell of a few records made by our squadron.

During the Buna Campaign half of our planes flew 25 missions for one month, the rest had an average of 10 to 15 missions for the same month. During the push up the New Guinea coast this record was again made and broken several times.

When I left the Group in April, 1944 quite a few of our original planes that we had flown across the Pacific were still in the fight. One in fact had 200 missions and 900 hours combat time.

This Group also made a record in maintenance, combat flying, etc, for the year of 1943, which was the best record in the whole Southwest Pacific. Also a record was made during a double engine change for one of the squadrons. Starting from scratch and nothing to work with such as new parts, adequate tools and under adverse weather conditions, the double engine change was made in four hours for each engine and this was accomplished time after time.

The B-25C, "Dirty Dora," that the November issue referred to, was one of our Groups original planes that we brought over and to my knowledge "Dirty Dora" is still laying her eggs.

M/Sgt. M. C. Simmons,
San Francisco, California

Thanks for accepting our challenge, Sergeant.—Ed.

RESEARCH FROM THE RANKS

(Continued from Page 19)

for the design of a special relief valve for hydraulic systems that shows promise of doing its job better than present devices. Safety locks which insure that a 50,000 pound drop test rig won't fall at the wrong time and crush test engineers, are the contribution of a corporal.

Two other soldiers, whose participation in tests has been directly responsible for advancing such projects as the pressurized cabin and the Anti-G suit, are Pfc. Milton H. Joffe and T/Sgt. Matthew E. Keller.

Joffe is one of the few persons who can tell you what it feels like when a pressurized cabin blows out. He was the subject for early decompression tests in a fighter cockpit before we had pressurized cabins in any fighter plane. They put him in a P-38 cabin mock-up whose inside pressures were equal to 8,000 feet, then with the whole fuselage inside a large low-pressure chamber they simulated outside altitude pressures of 35,000 feet. When everything was going smoothly, someone smashed in an aperture in front, instantly equalizing inside and outside pressures.

More than a hundred times Joffe climbed into the test chamber and was "explosively decompressed." Air gushed from his mouth and nose, his cheeks puffed out but nothing harmful happened. Joffe had helped to verify what aero-medical experts long had preached—that within limitations pressure cabin "blow-cuts" were harmless to the human body.

Keller did the same thing for the proponents of the Anti-G suit. Time and time again he has been whirled round-and-round at tornado speeds in the centrifuge, withstanding terrific G-forces. Sometimes wearing the Anti-G suit, sometimes without it, he accumulated data that have made possible improvements in the suit design—lightness and comfort.

Oddly enough, a big aeronautical research center is hardly the place you would look for a sculptor, but Sgt. Robert Charles Koepnick is one of the best. So modest that he reddens up like a beet, when you talk to him about his work, Bob is indirectly responsible for the shape of the A-13 pressurized oxygen mask. From rough drawings he fashioned the first mask in modeling clay. Working against exacting measurements—33 in all—he carved four different sized wooden heads which serve to measure helmet sizes, are used to check helmet designs.

Pvt. Mortimer M. Marks, former owner-treasurer of the Marks Polarized Products Corp., N. Y., is now engaged in experiments with new plastic lenses for pilot's glasses. He also has worked out a new blind-flying training goggle that may eliminate some of the difficulties in blind-flying training.

There are men like S/Sgt. Horace A. Knox, T/Sgt. Francis L. Wallace, T/Sgt. Raymond A. Gregory and Pvt. Bloyce D. Fitzgerald, whose work on special projects has made more than one of our enemies wish he could get out of this war.

Sergeants Knox and Wallace together worked out some intricate details on new bomb-dropping mechanisms. What's more, they left their drafting tables and machine shops, piled into a couple of B-17s in the early summer of 1944 and took the "works" over to the ETO, handing the Germans in France and in the Fatherland some surprise packages they won't forget for a long time.

Sergeant Gregory, 24, of Cleveland, Ohio, won his claim to fame one day in December, 1943 when he demonstrated a new shipboard landing technique to high-ranking Army and Navy officials.

Private Fitzgerald developed a quick and easy method for finding flaws in life rafts by charging the rubber boats with high-frequency current. If sparks flew out there was air leakage; if nothing happened the rafts were sound. The test could be accomplished in minutes where previously it had taken a full day. He helped develop a new cooling device for aircraft machine guns that injected water drops after each round and permitted faster firing.

In the same laboratory there are other men, who are doing equally important engineering jobs: S/Sgt. Russell L. Fine, instrument expert, who is perfecting a tail-pipe temperature indicator that warns pilots when the engines on a jet-propelled aircraft overheat; M/Sgt. Charles W. Woolsey, whose contribution toward development of training devices has, according to Maj. G. C. Melvin, officer in charge—"Simplified some highly technical trainers to a point where even a bobby-sox chaser can understand them."

Or, take Pfc. Reuben Raskin, whom his associates call the GIceman. Eight years of refrigeration engineering in civilian life helped him to develop a knock-down portable-by-air refrigerator now standardized. He is also responsible for helping perfect lightweight air-conditioners for B-29s that enable mechanics to work in pleasant temperatures inside the big bombers when it is necessary to do interior repair work on the ground.

Too, there is Pvt. Morris Nolly, a professional engineer from Delaware. If you saw the fantastic lighting effects that glamorized beautiful girls in Billy Rose's World's Fair Aquacade, you saw some of Private Nolly's talent at its best. He designed the whole lighting arrangement. Now he's using his talent as a research engineer for AAF runway and field lighting systems.

Some of these GI wizards not only think up new ideas, draw up the plans for their own creations and fabricate the inventions, but they go out and run the proof-tests to show that what they have done is beneficial to the AAF.

Take, for instance, big, rugged S/Sgt. George Browne.

In April, 1943, they put him adrift in the Gulf of Mexico alone in a new type of multiplace lift raft, complete with all the then latest sustenance kits, to see how well he could live. Of course, there were boats with other test engineers standing by most of the time, but at night and when the seas rolled up as high as a two-story building George was pretty much on his own. He sweated and baked in the sun all day, then shivered and froze in the cool breezes at night. He fished. Ate his catches raw. It was no picnic, but then neither is it fun when the real thing happens.

It practically wore him out when they ran tests on climbing into the raft. He'd swim up near it, grab hold and over it would go. Then he'd have a hard time getting it rightside up again. That experience gave birth to Browne's contribution.

He devised small rubber handles that are glued to the top and bottom of rafts so it's comparatively easy to grab hold and turn them over. And he developed a small one-rung ladder that makes it less trying to climb aboard when the sea is rough. Guys can thank George for that.

Air-sea rescue stories wouldn't be complete without mention of M/Sgt. Edward J. Pekel, one time inspector for a heavy bomb group of the 13th Air Task Force and now a technician in the Aircraft Radio Laboratory, at Wright Field. Pekel is a tough, seasoned combat veteran—Guadalcanal, Midway and other Pacific isles—who was ordered back to the States because of his exceptional ability in radio repair and experimentation. With Maj. Ray Seale, in a jungle workshop, Pekel put together from scrap pieces, a new radio aid for life rafts. For this work Pekel got the Legion of Merit, commendations from the CG of the 13th Bombcom and General Arnold.

Now he is perfecting the device—an electronic beacon — which guides search planes to a stranded raft. The lifesaving instrument soon will become part of every raft.

Another radioman, S/Sgt. Paul A. Millerwise, has invented a portable "radar car" which is used for testing radar apparatus and other similar equipment on the ground. Previously it was necessary to run actual test flights in order to try out new equipment. Now the apparatus, etc., can be put atop the car and tests run on the ground—saving many flying hours and permitting tests to be made in all kinds of weather.

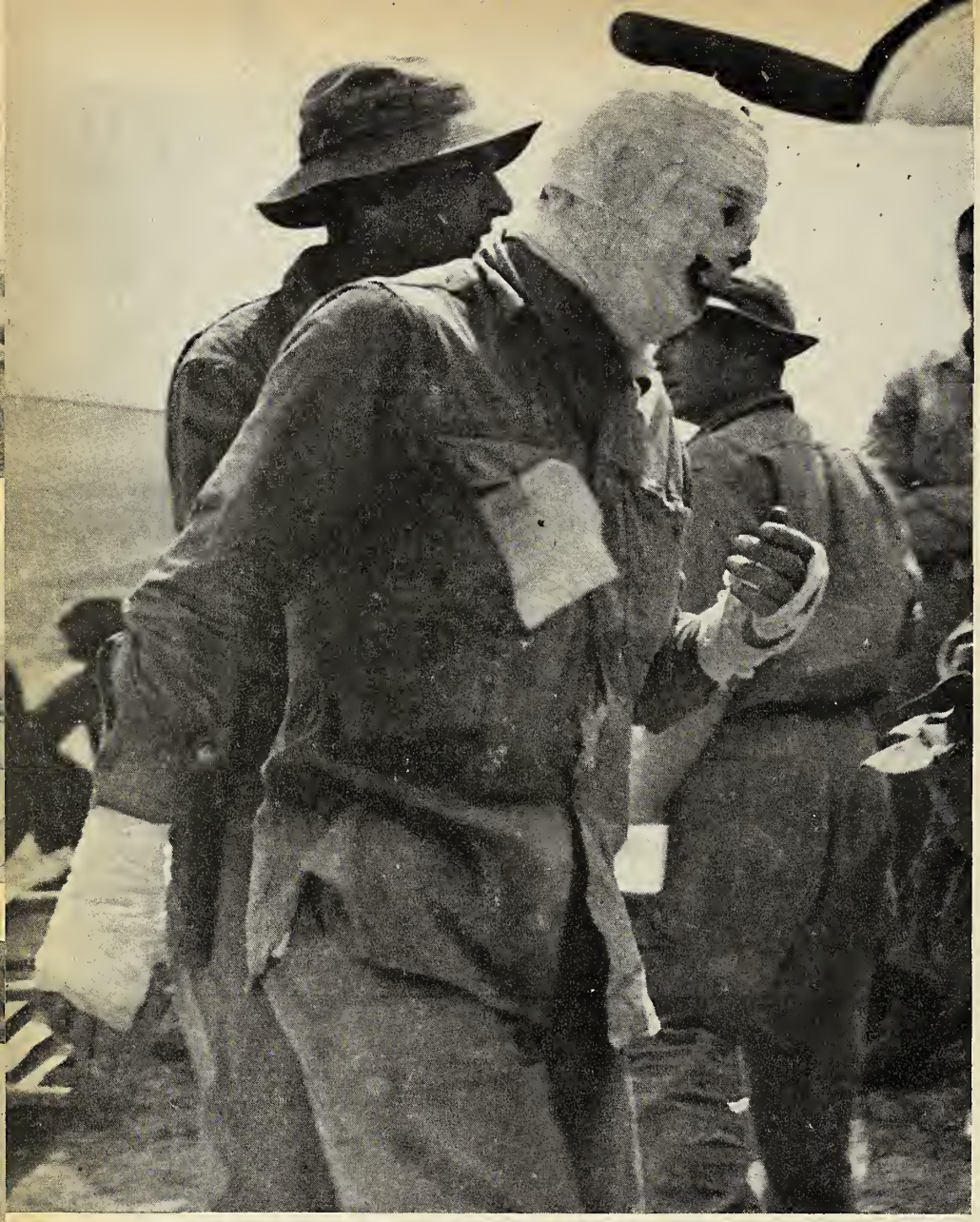
Another piece of equipment is the idea of Sgt. Nicholas T. Simopoulos, who has been given complete responsibility for its design, test, procurement and production. Officers over him say the device will be used on all Very Long Range aircraft and may save millions of dollars of equipment.

Dive-bombing also is getting a shot in the arm today because of work done by T/Sgt. Edward E. Tassi.

Tassi is one of the few EM who can boast of diving in a P-38 at speeds up to 500 mph. During 30 or more tests, Tassi sat hunched up and strapped "piggy-back" in a Lightning when it made dive attacks on ground targets.

Such is the story of the men in the ranks, who take their slide-rules, microscopes, and mathematical formulas, combine them with mechanical ingenuity to help build better fighting planes—the GI ENGINEERS.

As Brig. Gen. F. O. Carroll, chief of the AAF's engineering research program at Wright Field, says: "They've done as much as any of our officers or civilians to help win the war. We need a lot more of the same caliber to finish the job." ☆



BURMA WOUNDE

Battle casualties in Burma no longer have to face long painful journeys back to hospital facilities. Air evacuation saves countless hours and countless lives

Badly burned, one of Merrill's Marauders walks unassisted to an evacuation plane.

Ambulances, backing up to a C-47 on a sun-baked airdrome, deliver casualties who will be hospitalized in a matter of hours, not da

Monsoon weather fails to halt India-Burma air traffic. Here a combat cargo plane takes off from Assam to supply front-line troops.

Chinese soldier is among those evacuated. Flight nurse stands by.

Glider pilot, wounded during Myitkyina battle, gets plasma infusion.

Jeeps with specially constructed litter frames carry wounded to plane.

SHOOTING THE BREEZE

Southwest Pacific. Almost every plane coming into a 13th Air Force base was reported sighting emergeney ground signals eoming from an isolated island. Patrol planes reported yellow marker sheets and life rafts pulled up on the beaches. Mirrors flashed at every passing plane and blinkers twinkled through the night. Listening posts heard SOS signals whieh failed to stay on the air long enough to be pinpointed. Flares shot aeross the night sky.

When this bewildering state of affairs was brought to the attention of Lt. James F. Mattox, pilot in the Crusaders, a B-25

outfit, he thought he had the solution. Shortly before he and his crew had been foreed down in the vicinity of the island from whieh the mysterious signals were eoming. They had been in such a hurry to reach their rescue plane that they had left their emergeney signaling equipment behind.

A party was sent out to the island, and sure enough, the natives were having a holiday with flares, roekets, mirrors and the Gibson girl. They were also reluetant to give up the equipment.

"We need," their ehief insisted. "We try make flyers come down here so we can trade carved wood and sea shells!"

Somewhere. At a certain airbase which shall be nameless an Army flyer getting ready to land was indulging in some spry radio repartee with the Wac in the control tower. Whenever she gave him instruetions he sang out with a cheerful "Roger-Dodger," and some of his other remarks were on the unorthodox, if not breezy, side. The gruff old major who was the Wae's boss listened to the dialogue with growing irritation, and finally snatched the mike himself. "Listen, Army number so-and-so," he barked. "Confine yourself to proper language. Let's have no more of this Roger-Dodger talk. That's an order."

"And who," said the flyer in silken tones, "may you be?"

"I am Major Sueh-and-Sueh," rasped the Wae's boss, "and I am the control offieer at this station."

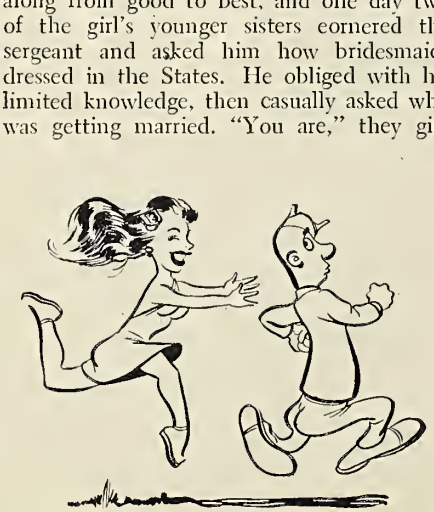
"Indeed?" replied the flyer. "Well, Roger-Dodger, old eodger; I'm a Major too!"

USA. Lt. S. A. White of Drew Field, Tampa, Fla., reeently returned to the States after spending some time as a prisoner of war in Germany. As part of his repatriation proeess the lieutenant was given a thirty-day leave whieh he spent in his home town. The news of his return spread quiekly. One afternoon the telephone rang and a neighbor told him how glad she was that he was back.

"But don't you dread going back to that German prison?" she asked. Before White eould reeoil, the solicitous lady added, "Does Germany give all prisoners of war a thirty-day vacation at home?"

Philippines. The staff sergeant tabbed her as just about the prettiest prospect in the village the moment he saw her waving shyly from the seeond floor baleony of her home. His outfit marched down the narrow street and on to their new quarters. But the sergeant remembered the address. He had eome ashore two days earlier and from the way she had looked at him from under flickering eyelashes he felt that his own private beachhead was seeured.

He eame baek next day and the girl went for him from the start. Her father considered him a fine, upright Joe, and all the girl's brothers and sisters scrambled over him to show their hospitality. Things went along from good to best, and one day two of the girl's younger sisters eornered the sergeant and asked him how bridesmaids dressed in the States. He obliged with his limited knowledge, then casually asked who was getting married. "You are," they giggled happily. "Next Sunday!" The sergeant's transfer to another island was arranged in the nick of time.



England. A GI who had been assured by his commanding offieer that he would be sent baek to the States, and then receive that "piece of paper," was putting it on for the squadron. He said he was going back and give Main Street some real hero talk. While he was building a partieularly beautiful air castle one day, a new man took him seriously. The breezy one warmed up.

"While I wouldn't want it generally known," he said eonfidentially, "I have seheduled an important conference in New York with the Big Three."

"The Big Three?" gasped the dope.

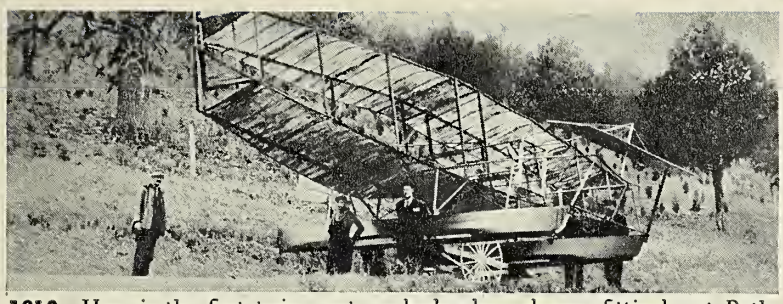
"Yeah," said the joker, flieking his cigar. "Hart, Schaffner and Marx."

Washington. Spring comes to everything, even the Pentagon Building. The other day a friend of ours, an attraetive lady too, thank you, emerged and found the cherry trees in bloom and the sun quite hot. As she waited for a bus she stripped off the jacket of her suit and stood there in her shirtsleeves, or blouse-sleeves, or whatever they're ealled. Then she noticed that a rather small, inoffensive-looking eolonel a few feet away was trying to eatch her eye. Whenever she looked at him, he smiled ingratiatingly and sidled a few feet closer.

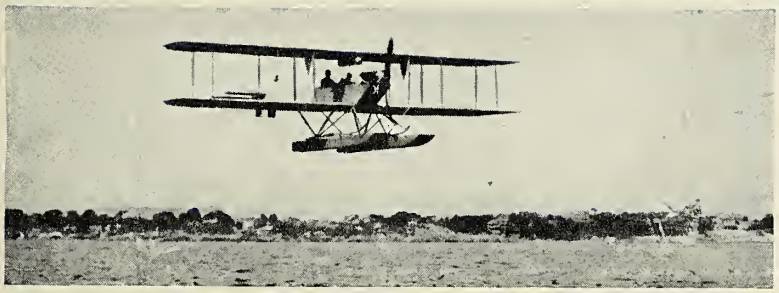
Our friend replied with a haughty stare, but the eolonel was not discouraged. He was, in faet, elosing in for a final frontal attaek when the bus mercifully appeared and the lady jumped into it. She seurried down the aisle with the eolonel's hot breath on her neek and sat in the most inaccessible eorner where she hoped she'd be safe. No luck, the villain still pursued her. And finally, when he had her at his merey, he leaned over and breathed in her ear.

"Excuse me, Miss; I just wanted to tell you—your shirt-tail is out!" ☆

THE ALBUM

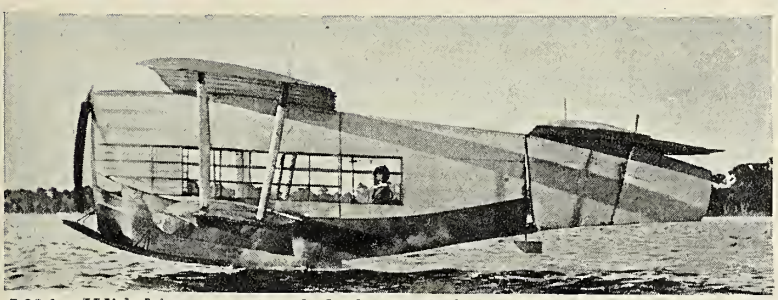


1910. Here is the first twin pontoon hydroplane shown, fittingly, at Bath, N. Y. These five gentlemen are probably waiting for the tide to come in.



1912. Nervously eyeing the drink, two Army men pilot their Renault Burgess. The hydroplane boys were always ready for a quick dunk among the fish.

1914. Lt. H. A. Dargue sits in the cockpit of an Army hydroplane at Corregidor. Get a load of the costumes on the junior life-savers at the right.



1916. With his water wings lashed securely behind him, Lawrence Lewis got this ferry boat off the surf in less than 5 seconds from a standing start.

N.Y. Tribune
Oct. 18-1912

DUCKS HUNTED BY AVIATORS IN 'PLANE

Beachey and Lieutenant Brereton, U. S. A., Kill Four Over the Potomac.

KEPT PACE WITH FLOCK

Novel Sport Rouses Others in Army Aviation School to Hope for Similar Chase.

Washington, Oct. 17.—A new sport was started, man's superiority over birds in their own element proved and the efficiency of aeroplanes demonstrated in an amazing way this afternoon, when Lincoln Beachey, aviator, and Lieutenant L. H. Brereton of the Army Aviation School, swooping over the Potomac River in a Curtiss hydro-aeroplane, dashed into a flock of wild ducks, shot four of them with revolvers and then dipped to the water and picked the birds up. The enlisted men at the aviation school ate the ducks for dinner to-night.

So enthusiastic were the aviators who performed the feat, and so enthusiastic were all the other aviators at the school, that duck shooting from aeroplanes is likely to become popular wherever aeroplanes fly.

When they started out this afternoon Beachey and the lieutenant had no intention of shooting ducks, although they had their revolvers with them. Just as they crossed into Maryland, however, the flock of wild ducks, flapping noisily, streamed up around the hydro-aeroplane. Frightened at the strange winged thing that stayed with them, the ducks made haste to escape, assisted by a thirty-mile wind.

Suddenly realizing the possibilities, Lieutenant Brereton pulled his revolver and began shooting. Beachey held the steering gear with one hand and with the other pulled his own revolver and began to shoot, too.

Lieutenant Brereton was the first to bag a duck, but the hydro-aeroplane was going as fast as were the birds and the aviators had little difficulty keeping within pistol shot of them. It was like a chase. The ducks seemed utterly confused. Never had they been so pursued. They dodged this way and that, but always the great, man-controlled bird was near them.

After shooting four of the ducks Beachey brought the machine to the water and started to collect the game. The shooting excursion occupied only twenty minutes. The aviators do not know whether they violated any game laws of Maryland, Virginia and the District of Columbia, whose boundaries meet in the Potomac about the point where the shooting occurred, but they do know that they have discovered a new sport, and that it is the most exciting every known. Incidentally, they say it shows that it is possible to shoot with great accuracy from an aeroplane.

"I suppose," said Beachey, "that this is the first time in the history of the world that ducks have ever been hunted by man flying in the air. Now that the thing has been tried out, I believe it will become very popular. Chasing birds in their own element is certainly the greatest sport of which I have ever heard or that I have ever experienced."

MRS. BELMONT'S FLAG GONE

OVERSEAS BARS

SERVICE STRIPES

BRONZE BATTLE STAR

SILVER BATTLE STAR

BRONZE ARROWHEAD

for information on your authority to wear these service awards,

SEE PAGE 25

RECD JUN 9 1945

AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES ✠ JUNE 1945

SMITHSONIAN INSTITUTION
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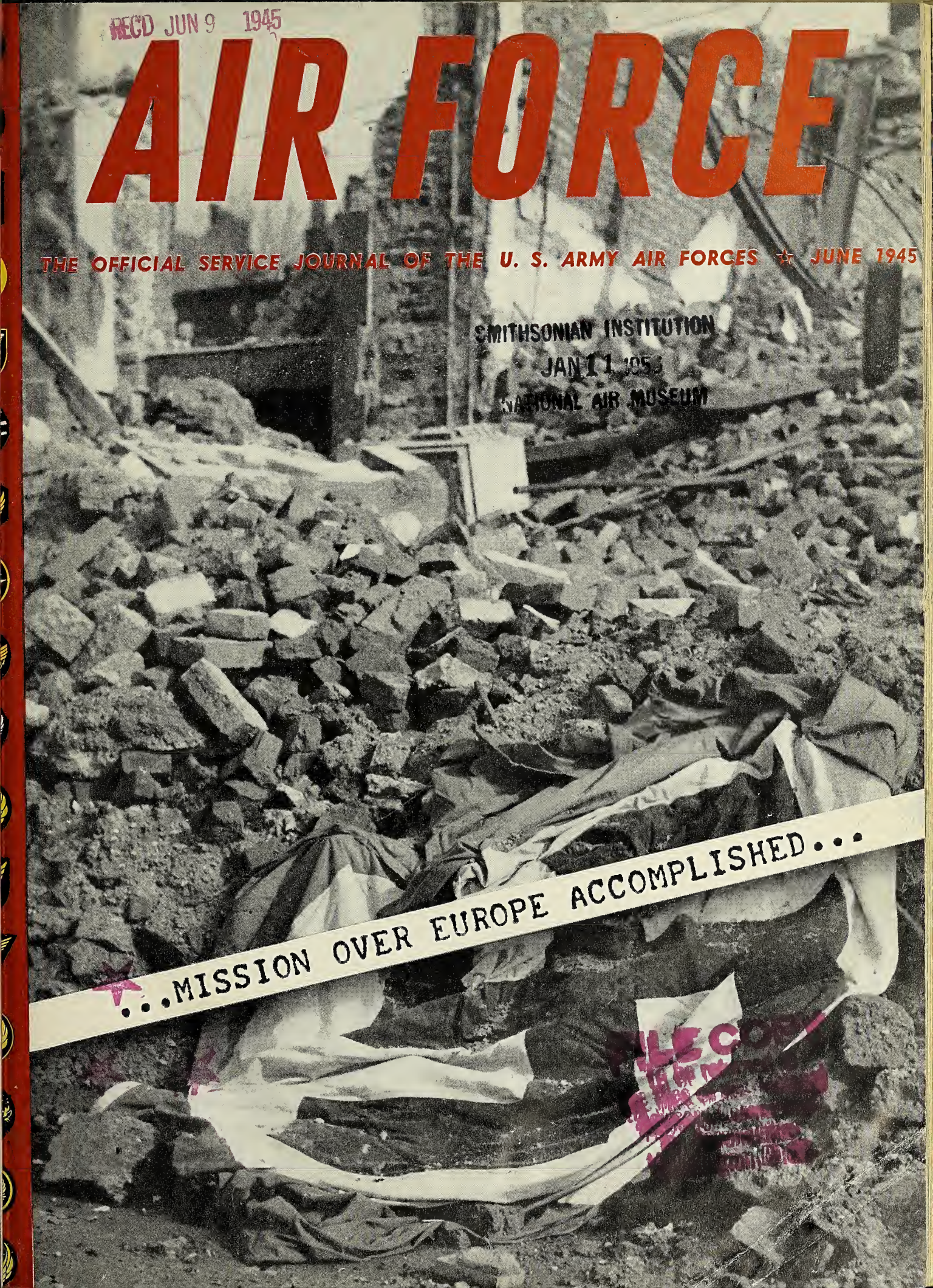
NATIONAL AIR MUSEUM



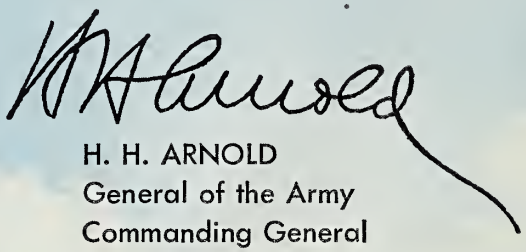
To all personnel of the Army Air Forces:

The might of the German Army has collapsed, and its leaders have agreed to Allied terms of unconditional surrender. I am happy now to be able to send my congratulations to the Army Air Forces for pressing our attack to a smashing climax. We stand now at the peak of our offensive power. As this is written, plans already are in motion to divert an avalanche of military might against our only remaining enemy—Japan.

The weapon that strikes home in modern warfare is the airplane. In our growing offensive against the Japanese, the Army Air Forces will play a vital role. At the same time, they must supply the punch to occupation forces throughout the world. Finally, they must maintain a network of supply and transport lines to all corners of the earth. A gigantic job remains to be done, and until it is done, no large-scale demobilization can take place in the AAF.

Those few men who can be spared will be returned to civilian life as rapidly as possible. They will be released from the AAF under the same standards that govern release from the Army Ground Forces and the Army Service Forces. Our rotation system will be accelerated. But for most of us, let me make it plain: We are fighting men in a fighting organization, and just as long as a single Jap ship, submarine, air squadron, or company of infantry remains to challenge us, our job is not done.

We are in this fight to the finish.



H. H. ARNOLD
General of the Army
Commanding General
Army Air Forces

Rendezvous

Captivating Cover

Dear Editor:

The WAC detachment of Spence Field is completely captivated by this month's cover (April issue).

It is quite evident that S/Sgt. Robert Gable would never lack pen-pals, etc., but he is elected as Spence Field's pin-up boy.

Can't we have his address? If Sergeant Gable will consent to this, please forward same in care of the undersigned, one of several eager to make his acquaintance.

Muriel J. Oakes,
Spence Field, Ga.

Sorry, girls. Sergeant Gable is happily married to his childhood sweetheart. While overseas, he wrote her every night.—Ed.

A GI and His Dog

Dear Editor:

Today I was reading the March edition of AIR FORCE and you could have knocked me over with a feather when I glanced at Page 37. There is a picture of a staff sergeant and a dog. I am dead certain that that dog belongs to me. I will explain.

When I was in Charleston, S. C., as a member of a heavy bomb group, we went out on a bivouac to Waltersboro, S. C. for about a week. The camouflage engineers there had a dog who gave birth to a litter of nine pups. I got one of them and named him "Bivouac."

That was in September, 1943. We were getting ready to go overseas. We got him a rabies shot and distemper shot at Mitchel Field. On the way over (we were flying over) the dog got pretty sick. I kept taking him to the vet's and nursing him and he finally came around after a few weeks. I had to carry him every place as he couldn't walk. Eventually we arrived in Italy.

We were a few miles from Cerignola in southern Italy. I pulled part of my missions and one day we were told we were going home on a 30-day rotation plan and would return after the furlough. I wanted to take the dog with me but was told I wouldn't be able to bring him on the boat.

I went home and had my furlough and went back to Italy only to find that the plans were changed and we were to be sent home again. I went back to my group to get my dog and I was told he was shot by an MP. Some of the fellows said he was seen in Bari. I didn't have time to go there, and anyway I was convinced he was dead. That was August, 1944. I went home and until today, had believed he was dead.

That's my dog. I know it is. If it ain't I'll eat all the sand in Texas. I would like to know where he is, who has him, and if there is any way I can get him back. I

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AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

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How Sharp are YOU?

A Photo test of Your Observational Accuracy

This photo was taken at Mitchel Field, just after an air evacuation plane had come in from the ETO. Look at the scene for 60 seconds, try to remember as many details as you can, then turn to Page 43 and see if you can answer the 10 questions we have asked about the photo. Score 10 for each question answered correctly. 70 is average, 80 is pretty good, 90 is peachy, 100 puts you at the head of the class.

HOW SHARP ARE YOU? Turn to Page 43

Rendezvous

(Continued from Page 1)

have pictures of him when he was a pup that are identical to the picture of the dog in the picture. My tail gunner is with me now, and he says the same thing.

S/Sgt. Martin H. Green,
Laredo, Texas

We received the picture from the Public Relations Officer, Hq. MAAF, and we suggest you write to him, c/o Postmaster, New York City.—Ed.

No Reflection

Dear Editor:

Before writing this maybe I should take a quick trip to the flight surgeon to see if my eyes are still 20-20, for AIR FORCE's April '45 "How Sharp Are You," Question 8, tells me there is "one" hatless man in the picture—I see two.

Take a look at the GI's reflection in the searchlight, and I believe that you will agree with me—do I get 100 or only 90?

W/O Lloyd D. Butler,
Harlingen, Texas

Take a quick trip to the flight surgeon.—Ed.

Personal Equipment T/Os

Dear Editor:

In your December 1944 issue, we read with interest your story on "The Careless Die Early." We are the enlisted men of a Personal Equipment Section, but we have yet to see the T/O your article mentioned as covering us. We do all we can to insure a safe flight for our flyers and hope that someday a T/O will come through as it did for our officers. We are still sweating it out.

Sgt. Guido Blanda,
and nine other enlisted men of
a heavy bomb group in the ETO.

Headquarters informs us that for sometime T/Os for single-engine fighter groups have provided for enlisted personnel in the Personal Equipment Section. Similar provisions for very heavy, heavy, medium, troop carrier, twin-engine fighter and night fighter groups are made in new T/Os and T/Es just published. The EM authorized carry MOSs other than Personal Equipment at present, but an MOS for Personal Equipment Technician is in the process of authorization.—Ed.

Further Clarification

Dear Editor:

Referring to the letter of 1st Lt. Peter M. Bowers, published in the April issue of AIR FORCE, in which he states that the Zeppelin biplane, shown in the December issue of the magazine, is the Siemens-Schuckert R-VIII, the following may help to clarify the subject: the aircraft was actually built by the Zeppelin works in Lindau, Germany, although the design might have originated with the Siemens-Schuckert concern, which has designed and built a number of very large multi-engine

aircraft, in 1918. About that time there existed a licensing agreement between Siemens-Schuckert and Zeppelin, and one dirigible was constructed by Siemens, while the Zeppelin works produced a number of "Giant" airplanes ranging in span from 130 to 150 ft. "Jane's All the World's Aircraft for 1919" credits these "Giants" to Zeppelin without mentioning Siemens-Schuckert.

The Basse-Selve, mentioned by Lieutenant Bowers, were used only experimentally because they were the only ones capable of producing anywhere near the horsepower required to fly the airplane. They were later replaced by the Maybach engines rated at 300 hp each. This substitution was also governed by the fact that Zeppelin works used almost exclusively the Maybachs to power their dirigibles and that they were a great deal more reliable than the Basse-Selve engines.

Based on the above, the original caption, calling the German "Giant" a Zeppelin biplane, is correct.

Alexis Dawydoff,
Recognition Branch, AAF

An Appreciation

Dear Editor:

Our heartfelt thanks for your recognition of the Air Force clerk in this month's copy of AIR FORCE. Believe me, sir, it's just the stimulation we need in doing this job that is full of boredom and monotony. To our knowledge, "405 Clerk, Typist" is the first article published in which recognition is given to the some 337,000 pencil and typewriter pushers in the AAF.

However, the cover and the text suggest that the clerk-typist is an NCO. May I alter this impression by mentioning that there are many Privates and Privates First Class with the MOS of 405 and even 502. Regardless, we'll still hold up our end by making out the furloughs and passes, keeping the service records, typing the hundreds of forms necessary for the movement of personnel and supplies and, in brief, typing our Air Forces to a grand victory.

Pfc. Richard H. Mazy,
Pfc. Sam A. Munafo,
Mather Field, Calif.

The Right Answer

Dear Editor:

While checking out in the AAF Quiz of the April issue of AIR FORCE, I noticed this error under question number twelve (12). Sez you, "The C-109 is a B-29 used as a fuel carrier." Stop me if I'm wrong, but having processed a few of the big iron birds, I practically guarantee you'll find the C-109 to be a modified version of the B-24, not of the B-29. It is, however, a fuel carrier. True?

S/Sgt. Charles J. Reeves,
Sq. D, Hunter Field, Ga.

To the sergeant and many others who caught this error: The C-109 is not a modified B-29. This airplane is a modified B-24 with built-in gasoline tanks which make it a tanker. It is used in China and I-B as a fuel carrier to supply the B-29s.—Ed.

(Continued on Page 46)

In This Issue

On our cover this month are the words: "Mission Over Europe Accomplished," backed by a photograph by T/Sgt. Roger Coster showing the ruins of a bombed-out German industrial center. These ruins are symbolic of the contribution which the Army Air Forces made to the prosecution and winning of the war against the Nazis, paralyzing their industry, obliterating their sources of oil, destroying their transportation systems. German General von Runstedt has stated that the biggest single reason for Germany losing the war was the Allies' tremendous air superiority which pinned down the Wehrmacht. To all the air force people who participated goes credit for a tough mission, well accomplished.

Next month we hope to announce publication of the first Far East Edition of AIR FORCE, printed in Manila. A dispatch that arrived at this writing, however, has made us cross our fingers. Here's the situation: Our paper and ink is on a ship in Manila Harbor. That should make us all set, but we are told that said paper and ink is at the bottom of the hold. On top of the hatches are loaded locomotives. It so happens that rails have not yet arrived, and the decision is that the locomotives will not be unloaded until when and if the rails do arrive. Maybe we're being railroaded?

The picture at the bottom of the page shows our correspondent in the ETO, Capt. Eric Friedheim (without hat) talking to Maj. Gen. Harry J. Collins, (left) commander of the 42nd Infantry Division, and another war correspondent, shortly after the capture of Schweinfurt (see "Beneath the Rubble of Schweinfurt," Page 4). General Collins gave our AIR FORCE correspondent a captured Nazi flag to be presented to the 8th Air Force group which sustained the heaviest losses in the aerial attacks on this center of Germany's ball bearing industry.

Friedheim has been in the thick of things for quite some time. Remember "Rhineland Rendezvous" in the May issue? The week before participating in that airborne operation, Friedheim went on a recce mission in a Lightning, riding piggyback. Of that episode he reports, "We took photos of the front, from Cologne almost down to Luxembourg. We had a minor scare when an FW190 appeared to our left, but we were up at 7,000 feet and in the sun. We dived and got the hell out of there in a hurry because the Lightning wasn't equipped with any guns."

"From Kansas to Tokyo," Page 18, is no second-hand account. Maj. Milton R. Krims, AIR FORCE correspondent in the Marianas, went overseas with the B-29 crew he is writing about, shacked with them when they arrived at their Marianas' base, flew with them on the memorable first mission he describes. Krims didn't let it go at that, but has flown on B-29 missions to all four targets mentioned in the article, "Air Blitz Against Japan," on Page 31, for which he gathered the material. Earlier in the war Krims was CO of a combat camera unit in the Southwest Pacific.

Incidentally, it was appropriate that Capt. Raymond Creekmore should illustrate the "From Kansas to Tokyo" article. Creekmore went on the first B-29 mission over Tokyo, on which he took his memorable Fujiyama photograph (see "Target: Japan," in the January issue). Before his return to the States, Creekmore also visited the Philippines. In fact, the L-5 in which he was a passenger was the first of our planes to land on Clark Field strip proper. It was still under artillery fire at the time.

Beneath the Rubble o

The ruins of this captured German ball bearing center support American principles of strategic bombing, and furnish a memorial to pioneers of the 8th Air Force

BY CAPT. ERIC FRIEDHEIM
AIR FORCE Overseas *Staff*

From the vantage point of an L-5 in the morning sky, there was a clear view of the town ahead and of the ring of German artillery dispersed in the fallow Bavarian fields around it. German troops and armored columns moved through the streets past rubble heaps and blackened buildings. A giant swastika waved defiantly over the factory chimneys near the railroad yards. The name of the town was Schweinfurt.

At an American field headquarters a few miles from Schweinfurt, commanders of the 42nd Infantry and 12th Armored Division hurriedly debated their next course of action. They had two choices. One was to punch through the circle of artillery and drive into the well-defended town. The other was to wait until airpower could soften things up a bit before the tanks and infantrymen advanced. It was decided to call on the air. While they waited, the 42nd laid down a withering artillery barrage on the German gun positions. The marksmanship was good and within a short time a number of the enemy's 88s had been zeroed by the division's gunners.

A few minutes before noon 72 Marauders from the 1st Tactical Air Force swept overhead. Threading their way through the antiaircraft fire, they carefully deployed when reaching the town. Bombs cascaded on enemy columns in the streets and on tightly massed vehicles in the center of the town. A second wave of 48 mediums arrived immediately after the first formation had completed its bomb run. It caught some of the enemy concentrations that were streaming northward in a desperate effort to find safer positions near the suburbs.

The Nazis had started reconstruction at the Kugelfischer works, but the AAF's relentless bombing kept the area covered with rubble.

When the second wave had passed, American infantry and armor moved forward, but there was still some fight left in the Germans. At 1700 hours a third force of 72 Marauders came in and gave the town a final going over. In a matter of hours the 42nd Division had fought its way into the outskirts. The next day Schweinfurt surrendered.

To the soldiers of the 42nd and the tankers of the 12th Armored, the name Schweinfurt didn't mean very much. To them it was just another name on the long road into Germany. Doughfeet of the 42nd had been moving steadily since the winter break-through that cracked the Siegfried line. The ruins of Wurzburg were behind them, and they stopped in Schweinfurt just long enough to paint the division's rainbow insignia on the Rathaus wall before setting off toward Nürnberg.

But to the American Air Forces generally and to the 8th Air Force in particular, the fall of Schweinfurt had deeper significance. Its capture ended a dramatic chapter in American military operations—the opening pages of which were written with the blood of a gallant band of airmen on a sultry summer's day in 1943. Its capture was the climax of what had started as a crusade back in the days when the American principle of strategic air warfare was still being greeted with skepticism.

Now, as the doughfeet of the 42nd Division and those of other Allied ground forces were marching across Germany, there was evidence everywhere to uphold the American bombing principle. On April 15, as a striking coincidence to the taking of Schweinfurt four days earlier, came a special Order of the Day from Headquarters, U. S. Strategic Air Forces in Europe, formally announcing that the strategic air war against Germany had ended victoriously and that hereafter our heavy bombers would be used for tactical operations. All strategic air units would continue with undiminished effort the final tactical phase of air action, said the Order of the Day, but the grueling strategic attacks against the heart of Germany's war machine had achieved the basic objectives.

For months the 8th and 15th Air Forces had roamed

Spilled among the ruins of the Kugelfischer factory (foreground) are the ball bearings which had been the target of 8th Air Force heavies since Aug. 17, 1943. Background aerial view shows bomb bursts scored by B-17s in April, 1944. Attacks sent Germans underground.

over Europe virtually unopposed, and it wasn't unusual to find more than 2,000 of our warplanes in the air on a single strategic mission. The strategic effort had come to a conclusion after an unprecedented battering of key targets which added emphasis to the conclusion that the Luftwaffe had been destroyed.

But one couldn't forget that many months before it had been the task of a hardy bunch of pioneers of the 8th Air Force to prove the efficacy of this type of aerial warfare. And one couldn't forget that it was this Bavarian town of Schweinfurt that nearly became a milestone marking the way to the defeat of a brave campaign—the campaign to show that the American theories of strategic bombardment were practical, that they would hasten Germany's doom, and that the cost in men and equipment would not be disproportionate to the results.

It was on August 17, 1943, a day marking the first anniversary of 8th Air Force combat operations, that 230 B-17s rose from their British bases to attack Schweinfurt's sprawling factories, from which flowed at least half of the ball bearing output in Germany and occupied Europe. That same day a companion force of 150 bombers set out for the Messerschmitt assembly works at Regensburg where they were to unload their bombs and proceed on to North Africa in the first American shuttle mission of the war. The combined force of these two missions was a small effort by present standards, but at the time it was the largest number of American bombers yet dispatched.

The Germans were ready for us at both Regensburg and Schweinfurt and put everything they had in the air. There was fighter escort only part of way against each target and the still potent Luftwaffe had a field day. One Fortress group on the Schweinfurt mission was attacked by 300 German fighters that peeled off 25 at a time into our formations. The effort against Schweinfurt cost 36 bombers; the Regensburg force lost 23 more. The 8th Bomber Command had lost more aircraft in a single day than in the entire first six months of operations over Europe.

Stung by this heavy loss, there were some who wondered if daylight attacks were the right thing after all. Then came October 14, 1943. The 8th Bomber Command sent 226 B-17s to Schweinfurt, now designated the most important target in Germany. Our bombers were met by 400 German fighters, among them twin-engine rocket-firing planes, the first time they had been encountered in force. The enemy struck in a perfectly timed and skillfully executed operation. Single-engine fighters came in from the front firing machine guns and cannon. Waves of the rocket-firing planes followed, standing off and launching barrages of their 8.3 inch projectiles from a distance. Then the single-engine planes attacked from all directions, followed closely by more rocket-bearers boring in from front and rear. Walls of flak were sent up by hundreds of antiaircraft guns. The fighter attacks persisted from the time the bombers reached Luxembourg until they were over the Channel on the return trip. The lead group encountered as many as 100 German aircraft attacking from all directions, had the automatic pilot equipment of its lead plane shot away before the bombing run, yet under these difficult conditions set a bombing pattern that resulted in 36,000 pounds of its bombs landing within a 1,000 foot target area, and 79,000 more pounds within a 2,000 foot target area. The other units of the attacking force followed the lead group, bombing with results that were appraised as "severe," "highly successful," "crippling."

But 60 Fortresses failed to return from the Schweinfurt attack of October 14, 1943. It was by far the greatest single-mission loss of the war to date, and the outcry against daylight precision bombing intensified. From several quarters came expressions of doubt that the heavy toll in men and equipment could be justified. Perhaps strategic bombing could not be conducted efficiently by daylight? Perhaps the strategic concept itself was not worth the price?

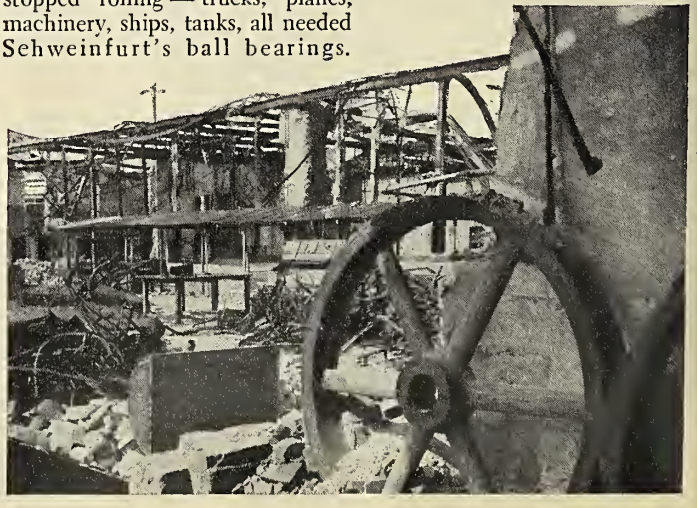
Those who controlled the destinies of American airpower remained steadfast against the mounting criticism. They were convinced that their cause was sound and that the Schweinfurt losses had been more than justified by the importance of the target and the damage achieved. They explained that the enemy needed ball bearings to operate his war equipment—airplanes, trucks, tanks, gun carriages, torpedoes, even submarines—and that the German ball bearing industry represented a potential war production bottleneck because it was impracticable to assemble any considerable stockpile of the bearings. From Washington, the President, and the Commanding General, AAF, reassured the nation that at Schweinfurt the enemy had received a smashing blow to one of his most vital industries, and that the American principle of strategic air warfare would be upheld by future events. But it was difficult, as it has always been, to answer air losses with aerial bomb damage photos.

Those of us who entered Schweinfurt behind the infantry this April day of 1945 recalled all this as we stood amid the charred and tangled ruins of what had once been the capital of German ball bearing production. We walked

(Continued on Page 61)

The city lay smashed and shattered from constant bombings. AAF mediums hit Nazi infantry and artillery day before Schweinfurt fell.

Germany's wheels of industry stopped rolling — trucks, planes, machinery, ships, tanks, all needed Schweinfurt's ball bearings.



ILLUSTRATED BY SGT. LOUIS S. GLANZMAN

As AAF men joined in drinking toasts to

Victory in Europe

they also lifted one for the road . . . to Japan

BY MAJ. ARTHUR GORDON

AIR FORCE Overseas Staff

To AAF men in the ETO, V-E Day seemed to come with maddening slowness. When it came, it simply made official what had been inevitable for weeks. Germany had surrendered unconditionally: the war in Europe was over.

At AAF bases from the windswept bleakness of Iceland to the hot glare of the Mediterranean men looked at one another with a queer finality and said in a thousand different phrases and with a thousand different inflections: "Well, it's over. *Fini la Guerre.* This part of the job is done, anyway."

Often they said it rather flatly. The edge was off the news. There had been too many rumors, too many conflicting reports, too many false starts. In most minds, moreover, there was still a large question mark about the future. "Now what?" they asked one another. "Most of us will get a crack at the Japs—that's sure. But do we go direct, or do we go home first, and who will be tagged for the occupation air force?"

Nobody seemed to know the answers to such questions. But there was one certainty that overshadowed all the rest. The Germans were finished. On the shattered cities of the Third Reich—the Reich that was to last 1,000 years—no more bombs would fall. Our fighters would still sweep the skies over Europe, but the tapes on their gun muzzles would remain unbroken. No flak would rise to meet the bomber boxes. No more airmen would be reported missing in action in this theater. There was much to be thankful for.

Even the Germans were thankful. The terror from the skies that had wrecked their homeland, destroyed their Luftwaffe, and—on the testimony of their best field generals—paralyzed their Wehrmacht, was ended. In Wuppertal, German women put on their fanciest summer dresses and picked their way through rubble-filled streets. In Munich, they passed without a glance the ruins of the Hofbrauhaus and the repaired cellar where the Nazi movement began. Their faces showed their relief, but if there were any trace of remorse, any consciousness of war guilt, the Allied conquerors could not see it.

For the AAF men who flew and serviced the Britain and Italy-based heavies, the urgency had disappeared from the war days before, when Allied armies biting into the shrinking Reich overran virtually all the important strategic targets. Airmen of the 8th, their work of destruction complete, had turned to the more satisfying tasks of ferrying food to the starving Dutch or flying their faithful ground crews at low altitude over German targets to see for themselves the results of the air attacks their patient work had made possible.

At some airfields in Great Britain, all personnel were restricted to their bases on V-E Day. This did not mean that there were no celebrations. One group had hoarded 198 barrels of beer for just such a contingency. Stations were manned by skeleton staffs. Finding themselves without a war, the boys at one group fought a mock battle with Very pistols, sending colored flares arching across the late purple twilight.

Reactions of individuals differed considerably. Some felt a curious let-down, a distinct sense of anti-climax. Others felt a sudden surge of inarticulate pride in their country and its achievement. At the bar of *(Continued on Page 62)*

Bombs from formations of 13th Air Force heavies rock Cavite, Ma

AIR STRATEGY IN LUZON

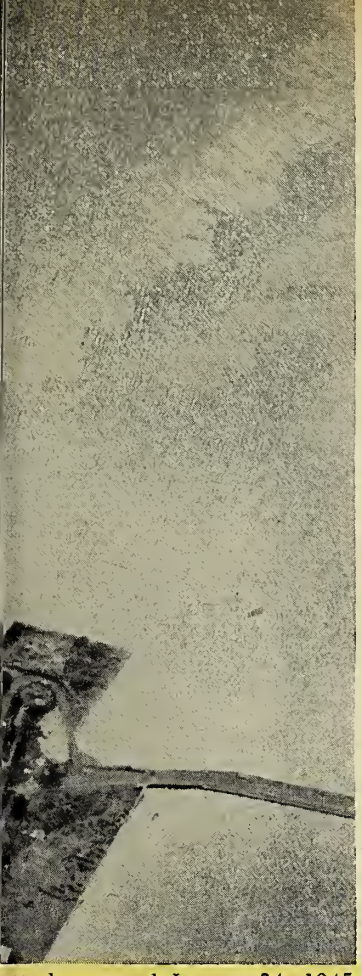
How the Far East Air Forces knocked the Japs' well-laid plans for the defense of Luzon into a cocked hat

By MAJ. THOMAS C. HARDMAN
AIR FORCE Overseas Staff

When American forces landed on Luzon in January and advanced rapidly down the rolling central plains, Gen. Tomoyuku Yamashita told the Japanese people that this was intended as a part of the Japanese defensive trap. He was only half kidding.

Probably the General still had hopes of effecting at least a part of his well-planned original strategy for the defense of Luzon, but he was destined to become the victim of two major blunders:

1. A gross underestimation of effective American air power and the unprecendented skill with which that power would be employed.



attack occurred January 24, 1945.

The heart of Manila goes up in flame and smoke. Four large fires are burning between the Bay and the Walled City which is a heap of ashes. The wide stream in the midst of the town is the Pasig River and the cartwheel in foreground is Bilibid prison. Note the Jap ships sunk in the harbor.

2. His own indecision which resulted in chaos and disorganization among his ground forces at the outset of battle.

Within a matter of weeks, the greatest concentrated Jap air force in history was blown to bits, and an uncontested, smoothly-functioning American Air Force proceeded with a systematic reduction of enemy communications and ground installations in a display of air-ground coordination unparalleled in the southwest Pacific.

Admittedly anticipating that the battle of Luzon would prove decisive in the outcome of the Pacific war, Jap military leaders had planned an elaborate defense long before the Allied landing on Leyte. Full air strength was to be an integral part of that defense, and General Tominaga, commander of the Jap Air Force in the Philippines, had drawn into Luzon fighters and bombers from Burma, China, Manchuria, Formosa, the Ryukyus, Japan proper and even the Kuriles.

General Yamashita, meanwhile, had begun to deploy his ground forces where they would have greatest advantage when the invasion came. For example, in the Lingayen area, where our forces eventually landed on January 9, he had planned to place well-reinforced ground troops in the high country on both flanks of the central plains, with a third force across the plains inland along the Agno River line.

Then, while his men would move in on the invaders from three sides, Yamashita was counting on the Jap Navy to stop American supplies and reinforcements from the south. The defense plan was a natural. But it was upset when our landings succeeded on Leyte. The Japanese Command was forced to shift ground forces from strategic positions in central and northern Luzon to reinforce garrisons in the Batangas area south of Manila, to prepare for a possible follow-up landing in southern Luzon.

It was late in December before this movement was reversed. The wily Yamashita apparently had decided that the Luzon invasion would come in the north, in the Lingayen area—but he was too late.

Repeated blows by bombers and fighters of the 5th and 13th Air Forces, and carrier-based naval aircraft already had taken a heavy toll of Jap air strength. With Leyte secure, the 5th, joined by elements of the 13th, began to have a field day blasting Jap troop and vehicle columns as enemy forces attempted to scurry back to planned positions flanking the Luzon central plains to the north.

Maj. Gen. Ennis Whitehead, commanding the 5th, reported to Far East Air Forces Headquarters that his planes between Christmas Day and January 16 had knocked out 79 locomotives, 466 railroad cars, 486 motor trucks, 18 tanks and 67 staff cars.

As our ground forces rolled south from Lingayen Gulf, this drubbing from the air stalled what was left of Yamashita's strategy for the defense of central Luzon. One after another, bridges were bombed out and highways were blocked by strafing fighters with the result that the enemy found movement of his troops and equipment as organized units an impossibility.

No opposition was encountered from the hills along the west flank of the north central plains because no defenders had been able to reach this area. The few troops who strag-

gled into the mountains along the east flank were too disorganized to put up a fight.

Only in the Rosario sector in the north did the Jap line hold, and here Yamashita was able to throw in forces he had retained in northern Luzon and the few reinforcements which had run the gauntlet of American air and sea power to land in such ports as San Fernando up the west coast.

Our forces moving south finally encountered their first stiff opposition in the ridges overlooking Clark Field. The Japs had been determined to hold Clark at all costs. The vast influx of Jap aircraft was destined to prove of little value, however, in the defense of the Clark Air Center. For, in addition to their wholesale destruction by our Air Forces, most of the enemy planes were unable to get off the ground because of an obvious lack of ground and maintenance personnel. This deficiency occurred despite the presence at Clark of the Manila Air Depot, largest Jap installation of its kind south of the Japanese homeland. The air center had been elaborately camouflaged and protected, in addition, by nearly 700 heavy, medium and light antiaircraft weapons supported by some 25 searchlights.

Liberator of the 13th AAF blasts away at Cavite Naval base, rebuilt by the Japs after it had been destroyed in 1942. Fires covered the entire area which contains arsenal, docks, cranes, and foundry.

With our ground forces sweeping down the central plains with so little opposition that close air coordination became unnecessary, General Whitehead's airmen had turned their undivided attention to Clark. B-24s came in with tons of demolition bombs. Low-flying B-25s, A-20s, P-38s and P-47s crisscrossed the lush target with devastating effect. Concentrated .50 caliber fire, parafrags and parademos destroyed scores of planes on the ground, blasted flak defenses, hangars and administration buildings, and slaughtered Jap defenders who darted about in frantic effort to escape the sweeping fire that covered the area like a blanket. In the air Jap interceptors were knocked down as fast as they closed in for battle.

Clark Field as a Jap aerial stronghold was done for. Enemy ground forces continued stiff resistance in the nearby hills but the air center was securely in our hands by the first few days of February.

A scene of complete devastation greeted our occupation troops at the air center. Hundreds of Jap aircraft, all types, were scattered, twisted, burned and bullet-ridden throughout the area. Others were found in relatively undamaged condition, affording our technical experts a happy hunting ground. Our emplacements were completely smashed, hangars and other buildings were demolished, and runways were pitted with bomb craters.

More than 200 new aircraft engines, some uncrated, were found buried under houses, in churchyards and beneath rice mills in a nearby village. Gasoline in 20 barrel batches was found underground in scattered areas. Even such equipment as carburetors, propellers, guns, tires, tools, generators and wheels had been cached in shallow pits all over the center. A number of underground shops were discovered, complete with electric power and generators.

The Japs had dispersed their planes over a wide range of territory. Some units were found more than two miles from the nearest runway.

While our engineers rushed in with their heavy equipment to repair and construct runways for our use, other enemy airfields throughout Luzon were being neutralized. Our B-24s also began to strike Formosa's vast network of airfields in earnest. The Japs soon became wary of coming up for a fight, whether the heavies were escorted or not.

Although some 20 of Formosa's airdromes were known to have held more than 400 aircraft during the last two weeks of January, our bombers went about their work with negligible opposition. Insulting jibes radioed to the Jap bases by confident aircrewmen failed to get them off the ground. A sample taunt was this announcement by one of our pilots:

"Aren't you boys happy that you won't have to patrol this area any longer? We are taking over the job now."

An indication of the steady reduction of Jap air strength and the increasing reluctance of enemy pilots to oppose our planes can be gained by figures on enemy aircraft shot down over Luzon during the first three months of this year: January, 184; February, 14, and March, 4.

Meanwhile, our ground forces had bypassed the heavily-defended Fort Stotsenburg area and the advance toward Manila was continuing steadily. Enemy troops in the north, however, were fighting even more furiously as our drive in that direction threatened the remaining escape route from the south into the Cagayan Valley.

Bloody battles were taking place in the hills around San Manuel, San Nicholas, Umnigan, San Jose, Munoz and Rizal. It was in this sector that the Japs finally committed the armored division which had been held in readiness down in the central plains, but it was not employed in striking force. The enemy used it piecemeal in counter-attacks and in antitank operations. With air power again aiding with low level strikes, our forces took advantage of this tactical boner, and the Jap soon lost his armored division. Remnants—minus armor—fled to the high country in the north.

As our troops entered the city of Manila and other invasion forces pushed inland from beachheads in the Zambales, Subic Bay, Bataan and Batangas areas, Gen. George C. Kenney took stock of the Luzon accomplishments of his Far East Air Forces. The figures were extremely gratifying. From January 1 through February 30, our aircraft, under the tactical direction of the 5th Air Force, had flown every day, despite frequently inclement weather; had dropped 47,485 tons of bombs, expended 28,500 rounds of 20 mm ammunition and 3,060,000 rounds of .50 caliber ammunition

The General studied an impressive array of targets struck. One thousand, five hundred sorties against Luzon's airfields; 1,600 more against targets of opportunity which included roving strikes on troop concentrations, gun emplacements—

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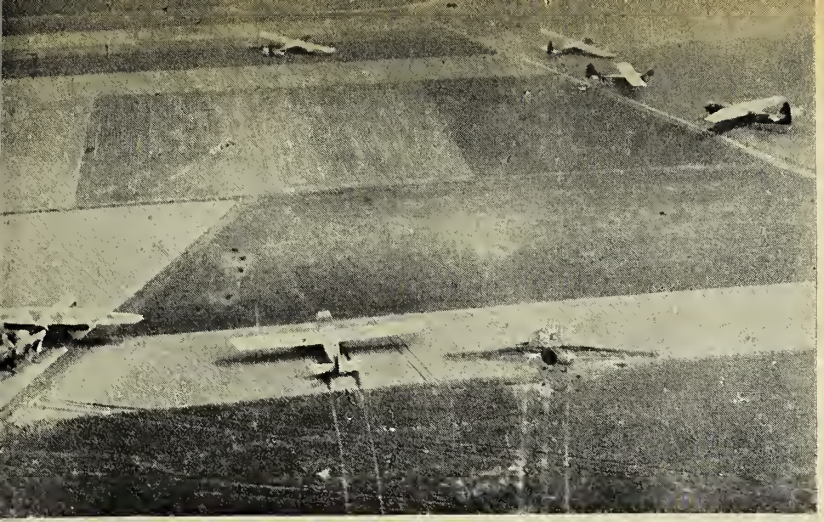


Field filled with AAF and RAF gliders shows strength of operation. Glider at right foreground caught fire during the landing, was reduced to ashes.

At 0100 hours on March 24th divisions of the 18th U. S. Airborne Corps began landing in an area 2-5 miles northwest of Wesel. They captured six bridges across the Ijssel River, made contact with British units sweeping eastward from the Xanten area.

One of "Raff's Ruffians" hangs helplessly from treetop.

Glider troops of the Airborne Army take cover against German defenders of the area. A total of 40,000 men participated in this operation.

From Dusk to Dawn

By an Air Force *Overseas Staff Correspondent*

At 8,000 feet the night was crystal clear and the lone A-20, knifing across the German lines, had little difficulty in picking up the Saar. When he reached the river, the pilot banked slightly and, with the coaching of his navigator, set course upstream to the target area. In a few minutes, the A-20 was close to Taben.

"This is it," the navigator said.

Quickly he made a final check, and while the pilot held the Havoc level, he released the flash bombs.

Within seconds, the sky and ground were drenched in the brilliance of an 800,000,000-candlepower light. Automatically the shutters of the cameras started snapping. Greedily, the camera drank in every detail of the terrain below.

An hour later, the A-20 was back at its Belgian base. At the mobile laboratory in a nearby forest, interpreters studied the photographs.

They noted with interest two bridges spanning the river near Taben. One was a two-span, concrete highway-bridge that had been badly battered during a recent Allied bombing. The photos clearly showed this structure still was unserviceable. The other was a steel-girder type in process of construction. Under the magnifying glass, however, the photograph revealed that a temporary flooring had been laid across the bridge's framework, indicating it was capable of handling enemy traffic.

Thus was exposed a trick by which the Germans hoped to fool Allied intelligence about their troop movements. The fact that the enemy was building the bridge was well-known to our G-2. Reconnaissance planes, flying in daylight, had been keeping a sharp eye on the construction work for several weeks, and Allied bombers were ready to pounce on it the moment it was finished.

The Germans, however, had no intention of completing the job. Reasoning correctly that the bridge wouldn't be bombed so long as it appeared unserviceable, the Germans had been placing a temporary flooring on the span nightly. Troops and supplies moved across until early morning, at which time the flooring was removed. As a result of these photos, we promptly removed the bridge.

This bridge incident is a good example of the important role played by night aerial photo-reconnaissance in the Rhineland operations. Because of overwhelming Allied air superiority, there was little the enemy could hide during daylight. To keep his movements secret, he was forced to rely mainly on bad weather or the cloak of darkness.

There was nothing we could do about the weather, but the 9th Air Force's 155th Night Photo-Reconnaissance Squadron ranged over hostile territory taking pictures of road traffic, gun positions, staff headquarters and railway lines. This detection of enemy activities from dusk to dawn proved invaluable to our armies on many occasions.

"Give us a good clear night," says Lt. Col. Joe Gillespie, commanding officer of the 155th, "and in many cases we can find out if Jerry is trying to put one over on us."

On the face of it, night aerial photo-reconnaissance ap-

When the cameras of the night photo reconnaissance boys pick up bustling enemy activity, it is certain that the bombers will pay a prompt follow-up visit

pears to be a simple chore. The three-man crews who fly the camera-planes of the 155th leave their Belgian airstrip a few hours after dark, and usually are over the targets across the Rhine in 45 minutes. Photographing a highway, a crossroads or a marshalling yard is a matter of five minutes' work, and the planes are back at their base within two hours after taking off.

Most of the combat roster of the 155th is composed of volunteers. The squadron likes to use men who have had experience in night fighting.

Aerial photography at night is still in the primary stage of development. The Germans have made some progress with complex cameras that can take pictures from altitudes as high as 25,000 feet. American effort in this field—much of it under the direction of Col. James G. Hall and Lt. Col. Richard W. Philbrick, veterans of air reconnaissance operations—has resulted in many advances. But there still is much to be done before the art is perfected.

For this reason most of the work performed by the 155th Squadron has been of a pioneering nature. The outfit has functioned as a tactical unit, with all the attendant dangers, and at the same time has served as a flying laboratory, testing new equipment and techniques of photography. The squadron has been forced to modify aircraft and equipment during the swift tide of battle, often overnight at front line airfields where there is a scarcity of tools and an abundance of discomfort.

Since the mission of a night photo-reconnaissance plane is flown entirely by radio aids and instruments, the squadron has spent many wearying hours of extra transitional training for its pilots and navigators. To fly through a blackened sky and pick out a quarter-mile stretch of highway or a few hundred yards of railroad siding on the map of Europe requires navigation of the most exacting sort.

To the casual observer, this type of operation might seem a reasonably safe and pleasant way to fight the war. The truth is, however, that the job of night photography in conjunction with the Rhine operations was an extremely hazardous assignment.

There was the night when most of the squadron's Havocs took off to photograph troop movements east of the Rhine. One of the A-20s, piloted by 1st Lt. Edward Bielinski, of Chicago, was enveloped by an overcast soon after leaving the target.

Bielinski took the plane up to 12,000 feet and then down to the deck to find an opening. But the cloud front was a solid wall and he gave the bail-out signal.

1st Lt. Stanley Stipick, of Burlington, Pa., the navigator, went out through the nose hatch and while he was drifting earthward he remembered that when he took his last navigational fix the plane was just above the German lines.

"There was a 50-mile gale blowing," he related, "and it blew me right back into Germany."

Landing on a snow-covered field, he started walking west.

(Continued on Page 63)

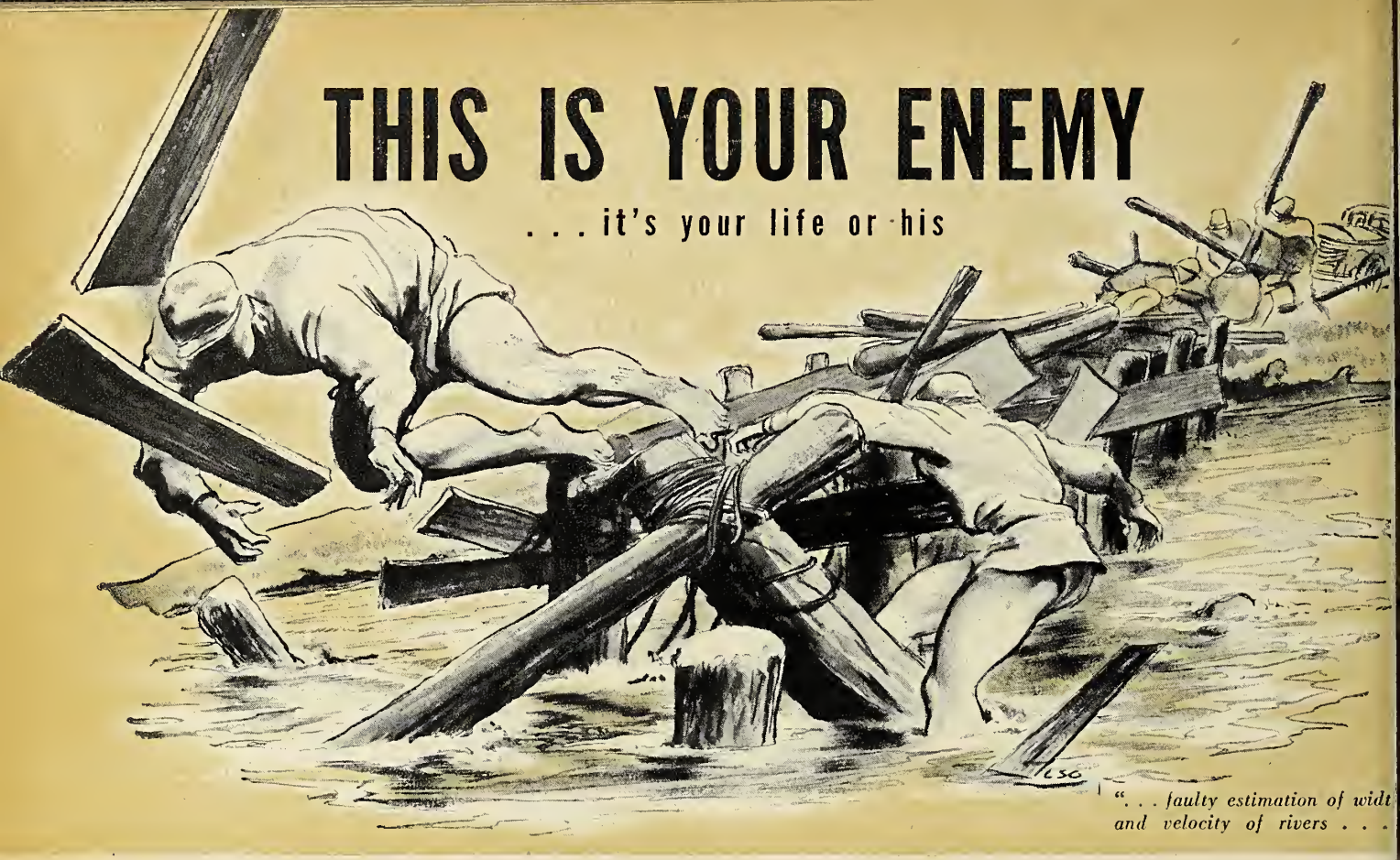
Lt. Col. Joseph G. Gillespie, Jr., CO of the 155th Night Photo Reconnaissance Squadron, handles the pre-midnight briefing.

An ordnance mechanic sets fuzes of the flash bombs which, upon explosion, will emit light equal to 800,000,000 candlepower.

T/Sgt. John McNicol, photo plotter, checks photographs to determine if recon crews covered areas indicated in field orders.

THIS IS YOUR ENEMY

. . . it's your life or his



". . . faulty estimation of widt and velocity of rivers . . .

ILLUSTRATED BY SGT. LOUIS S. GLANZMAN

Seeing the Picture. The Japanese are having their troubles with photo interpretation. A training critique on the subject points out that "great errors in interpretation" have considerably hampered the military progress of Nippon. Among the blind spots are bridges, jungle terrain and rivers. The Japs, they tell their PIs in training, have incurred great losses from the following types of slips: assuming that 80 cm. footbridges will carry military vehicles; not recognizing steep slopes, marshes and narrow roads in the jungle; faulty estimation of width and velocity of rivers. It appears that some Jap PIs have assumed that any narrow river means an easy crossing, but troops ordered ahead have often hit gorges and impassable rapids.

Jerry Propwash on Fighters. Even a Nazi has a right to his opinion about aircraft. German pilots, discussing fighter planes, naturally list their own among the very, very good. As for Allied fighters, they have mixed opinions, based largely on combat under 20,000 feet. Following comments are typical: "P-51—only the best ME109 pilots can outturn it." "P-47—great diving speed and ability to absorb punishment." "P-38—extremely fast in a climb." "Tempest—speed, climbing ability." "Spitfire—most formidable, rapid climb, tight turn." Of their own fighters the Luftwaffe pilots add that they consider the ME109 better than the FW190 in a turn and dive, but the FW they rate as a great climber.

Signals Off. A member of an air-ground team in Burma was embarrassed not long ago by unexpectedly close liaison in the wrong direction. He says that he was directing the attack of 12 P-40s against Japanese positions shortly to be attacked by Chinese ground forces. When a flight of four planes came over, he was right on the ball. "Four of you are directly over my position," he reported. "The target . . ." Then he saw the large red blots on the wings. From a distance his message was taken up by the P-40s, which had already spotted the Oscars just above him. He is now majoring in aircraft identification.

They Don't Know Everything. Long ago the Japanese publication Koku Asaki printed pictures of B-17s in flight, with Fuji in the background. Besides Fortresses, B-24s, P-40s, A-20s, PBYs, and other American aireraft have been reconditioned and flown by the Japs. The fact remains, however, that the JAF has not succeeded in duplicating some of the most important American aircraft instruments known to have been captured. This is the answer to easy-going assumptions that just because a plane has been "shot down over enemy territory," all its secrets are spilled.

ME262 . . . by Stages. Employment of the ME262 has been described by expert observers as falling into three development stages. First, there was a period of "capability tests," in which the jets were simply "flown" into interception and avoided fighting. Obvious purposes were to aequaint pilots with their aircraft and "let the plane out" experimentally. Second, the ME262s concentrated their attack on escorts. Stragglers were special targets. Attempts were made to force planes to drop external gas tanks, cutting the range of the escort. Finally, the most recent development has been direct attack against bomber formations. Approach has usually been from 6 to 12 o'clock. When Allied planes have been strung out over a target, jets have usually ignored German flak and sailed in.

Arado Takes a "Nolo" Flight. After bail-outs, propellered aircraft have often flown crewless in this war. One of the earliest jet "nolo" flights was made by an AR234. The Arado was sighted in the Bielefeld area by a Mustang pilot. The jet was loafing along, and the Mustang easily overtook it. As the American came up fast from under, at about

10,000 feet, the German must have lost his nerve. Maybe he had read in the book that jets don't accelerate very fast at slow speeds. Anyway, he jumped. His plane continued to fly for about 10 minutes, during which time the P-51, which was equipped with cameras, followed it throughout its lonesome maneuver, taking pictures. The resulting movie was entitled, "The Unwilling Waffe."

Nipponese Notes. The Japanese have not only adopted the German buzz-bomb, but are also probably indebted to the Nazis for miscellaneous data on German jet planes. . . . Allied planes continue to report scattered use of Jap flak cars, land mines as antiaircraft defense, and rockets in various guises. . . . Sharp-eyed EAC interpreters spotted some fine "sitting duck" Sallies all ready for strafers. In the next picture, the same interpreters noted that AA emplacements had been added to the revetments. . . . Some Tojos are packing two 12.7 mm machine guns and a 40 mm. cannon. . . . Among Jap antiaircraft projectiles spotted at Iwo was a parachute missile seen at 2,000 feet. The container, suspended by a four-foot cable, was about 2 feet long. Coming down, it spurted flame. . . . Reports that Japanese fighters are pressing their attacks more closely than before have been accompanied by a summary of B-29 gunnery results from a series of missions. Out of every 8 Jap fighters attacking within range, the Superfortress gunners destroyed, probably destroyed, or damaged 3 of them.

Air Sagas of the JAF. "While lying in wait for enemy raiders at an extremely high altitude, I spotted a formation of B-29s. One enemy plane lagged behind 1,000 meters. Its altitude was 8,500 meters. As its right wing slid about 100 meters below the belly of my plane, I pounced on it. I opened fire and riddled the B-29 with incessant shots . . ." That is Sub-Lieutenant Masuda broadcasting on Radio Tokyo for the Japanese Army Air Forces, which have begun to make a regular thing of air heroes' stories.

Perhaps the individual is still submerged in his unit and the Empire, but individual exploits are good grist for the propagandists. Radio Tokyo and Domei are collaborating on the series. The pattern is pretty well set, and follows a dramatic prescription. A junior officer or noncom turns up before the microphone well primed. His story is always pitched against fearful odds. He introduces a bit of suspense here and there, but speeds up at the end, filling the air with adjectives and closing on a "spiritual" note. So Lieutenant Masuda goes on:

"The B-29 was mortally hit. It vomited black smoke and began to lose altitude. The smoke changed to white as the plane nosed toward Tokyo Bay. My fuel was running short, but I was determined to confirm the result. The enemy raider began to whine in agony. Violent explosions . . . huge columns of water . . . red and black flames . . . the raider was swallowed up. Unable to control my emotions, I shouted 'Banzai,' and returned to my base."

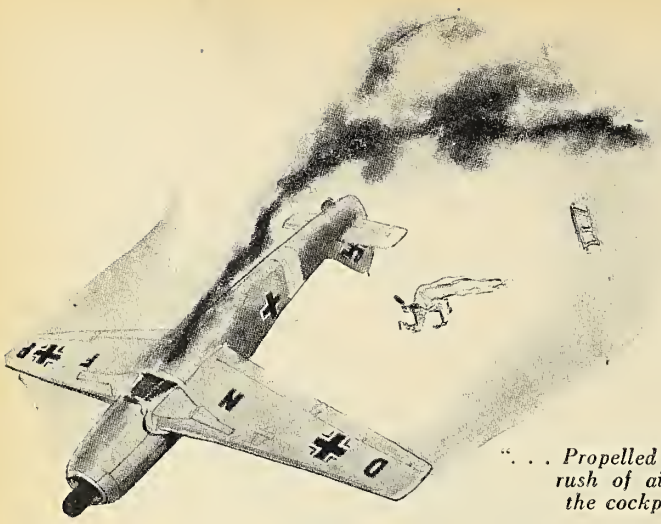
Japs over Airdromes. Summarizing Japanese methods of attack on American airdromes, the 14th Air Force notes the following recurrent tactics. Altitude of the bombers' approach varied from 4,000 to 6,000 feet, and intervals of attack ranged from five minutes to an hour. Usually bombers came in singly, although occasionally two or three planes were over an airdrome at the same time. Direction of attack was consistent. There was a marked increase in demolition and incendiary bombs, and the use of the "banana" bomb was common. Japanese leaflet-raids were described as carried out in an "off-and-on, hit-or-miss, what's the use" manner.

End of a Myth. About 12 miles north of Bangkok lies the Don Muang airfield, perhaps the most important operational base in Siam. In Japanese propaganda it has been an example of the "unreachable" strong points of the Co-prosperity Sphere. Suppose, said the propagandists, that an occasional bomber foray did get in, never would there be anything but desultory attack, and never, never would there be systematic going-over by fighters.

". . . Mustangs . . . raised general havoc . . ."

At 1015 on March 15, over 35 P-51s set out from a field in Burma. Their target was Don Muang. Flying one of the longest single-engine missions of the war, the Mustangs reached the field and raised general havoc. One American plane was lost, one hit. The Japanese lost numerous planes, facilities, and a myth.

Japanese Phrasemaker. A phrase-making Jap correspondent covering Southern Burma has explained to Tokyo readers that American pilots in his theater are very funny. For example, he writes, these Americans fly their missions with such regularity that the Japanese ground forces have called



". . . *Propelled by the rush of air from the cockpit . . .*"

their routine "The Time Clock." In the vicinity of the Old Burma Road to Yunnan, they often get "tripped by tree branches, throwing the Japanese into hilarious laughter." Equally side-splitting is the American "maneuver" in which the tail-end of one AAF plane smacks another, so that an entire formation goes down. The name for that one is "Airplane Nine-Pins."

Jots and Tittles. The newest name in German planes, TA154, honors the aircraft designer, Kurt Tank, who dreamed up the new fighter manufactured by Foeke Wulf. . . . The new crop of V-1s turned up with occasional wooden wings—saving 50 pounds in weight. . . . To make Allied attackers believe that hits have been scored on German transports, the Wehrmacht recommends lighting smoke pots and gasoline containers for fiery effect. . . . The Germans have adopted flares planted on mountain tops as a means of aircraft warning. . . . A recent set of instructions to Jerries who bail out ends with a frank bit of hedging: "Release your safety belt. Jettison cockpit cover. Push control column hard forward. You will fly out, propelled by the rush of air from the cockpit and your forward motion, which tends to keep you moving horizontally while your plane noses down. Thanks to this downward motion, pilots clear the tail in almost every case."

Hard to Swallow. A local newscaster on the Jap-controlled Radio Manila in autumn said:

"Now that no other lubrication is available, castor oil remains the only possible source of oil for all transport machines."

Different, Important. Geisha girls trained as aircraft-instrument inspectors were recently interviewed by the Japanese press. Most articulate of the comely patriots who had exchanged evening-dress for the Mompei uniform, was a Miss Sato. Formerly she had been famous for her stewing of samisen and pouring of saké. Now, according to Miss Sato, the geisha girls work a straight 8-4 shift instead of their former 5:30-2 A.M. schedule. "My present work is quite a bit different," she told reporters. "An important little cog in Japan's aircraft production machine," concluded her supervisor.

Open Season Continued. Booby-trap season never closes. Among Japanese devices for spreading sudden death, three adaptations of old principles have been noted. They follow a set of well-tried tricks; using familiar and unsuspicious objects, connecting explosives with an innocent bit of "nature," and planting destruction where human curiosity or souvenir hunting will set it off. The first gadget is simply a bar of soap, a widely advertised American floating brand, complete with trademark and manufacturer's name. Purpose: incendiary.

The second is a harmless looking cocoanut. It houses an adapted Type 97 hand grenade. The third has been given a complicated name, "Cloth Bag Demolition and Booby Trap Assembly." It is sure death for the man who tampers with it; besides, it can be attached as a delayed demolition charge on moving equipment.

Word War. Japanese and German propagandists, in big type and with sound effects, have done what they could to bring their messages up to date with the situation maps. Lt. Colonel Shozo Nakajima told a full dress press conference in Tokyo that the Superfortress raids were bagatelle bombing compared to the disaster of an earthquake. He reminded the newsmen that in the Great Kanta catastrophe of 1923, 270,000 of Tokyo's houses were razed, and thousands damaged. It would take 70,000 Superfortresses, he figured, to approximate that kind of damage. The Colonel studiously neglected to recall that "foreign" help was one solution to the 1923 disaster. Nor did he point out that now the United States is on the side of the earthquake. . . . *Front und Heimat* has given the Germans a definition of two leading types of military cowards. "One kind," declares FUH, "tells civilians the most fearful stories. Apparently he is being hunted by hundreds of Soviet tanks which have just broken through the lines. In this way, he tries to camouflage his fear, explain his fright. The other type acts calm and prudent. He declares that things could be worse, probably, and that after all the Russians are not a very bad sort. . . ."

Tokyo newspapers have acquired what they called two "American documents." One purports to be a memorandum to B-29 crews, saying, "Drop bombs anywhere; come back quick." The other, quoted by Tsuchiura, Domei correspondent, gives Americans who may be shot down over Tokyo directions for "proceeding to American Headquarters in Tokyo." This worries Tsuchiura, who explains that there is nothing in Tokyo that can be described as American Headquarters. . . . *Das Schwarze Korps*, one of Germany's leading military periodicals, condemns civilian growlers who grumble at two-way evacuation. "When evacuees from the East meet evacuees from the West," concludes the SK, "space problems will not permit left-hand solutions. Relentlessness is demanded to break the stubbornness of those who complain. When a nation's life is at stake, one does not say what can or cannot be demanded." . . . Japanese newspapers and Radio Tokyo have collaborated on an announcement that it is the considered opinion of the Government that American propaganda leaflets are "absurd and ridiculous." . . . As for the Japanese Government, Tsuneo Kanamitsu, member of the Diet, got up courage to declare publicly its complex structure should be "courageously abolished." The Oriental solon had no intention of being ambiguous. ☆

Some flight facts and combat characteristics on three fighters of the Jap Army Air Forces

BY CAPT. W. H. CARTTER

Chief, Foreign Equipment Unit, ATSC, Wright Field

The principal fighter opposition to our conquest of the Pacific islands has been provided by aircraft of the Japanese Navy. Their fighters include the Zeke 22, Zeke 32 (the Hamp), and the more recent Zeke 52. In the opinion of technical men who examined them, and pilots who fought them, these planes could not compare with our current fighters. Now, however, as we reach territory controlled by the Jap Army, we can expect to find Army planes which differ greatly from their opposite number in the Jap Navy.

The standard Army fighters, as exemplified by the Oscar Mark 2, Tony and Nick, reflect the Japanese attempt to make up for their original disadvantages. These planes have armor plate—a radical departure from early Jap aircraft—and they have heavier machine guns, more powerful engines and greater speed. Some have leak-proof tanks, another innovation for the Japs. They can turn better than anything we have at low speeds and outmaneuver and outclimb our best at low altitudes. Nevertheless, the opinion of our experts remains the same: these Jap Army fighters have certain good characteristics, but for all around usefulness they are outclassed.

Take the Oscar Mark 2, for example. It is a single-engine fighter with a radial air cooled engine, a three bladed propeller and a top speed of about 345 mph at 20,000 feet. This speed does not compare with that of our fighter aircraft which are better by at least 50 mph at 20,000 feet and by about 70 mph at 25,000 feet.

However, the Oscar Mark 2 can climb faster than either the P-38G or the P-47C up to 15,000 feet, and faster than the P-51C between 5,000 and 20,000 feet. Something new has been added here, for previously Jap fighters lost their rate of climb advantage in the higher altitudes. At 5,000 feet, the Oscar Mark 2 goes up at over 3,000 feet per minute, and at 10,000 feet its rate of climb is about the same. At 15,000, it drops off to a bit over 2,500 fpm, but that is still slightly better than the P-38G, and still better than the P-47D.

Furthermore, there is the fact that the Oscar Mark 2 is the most maneuverable of all the present Jap fighter planes. American pilots who have tried to turn with the Zeke 52

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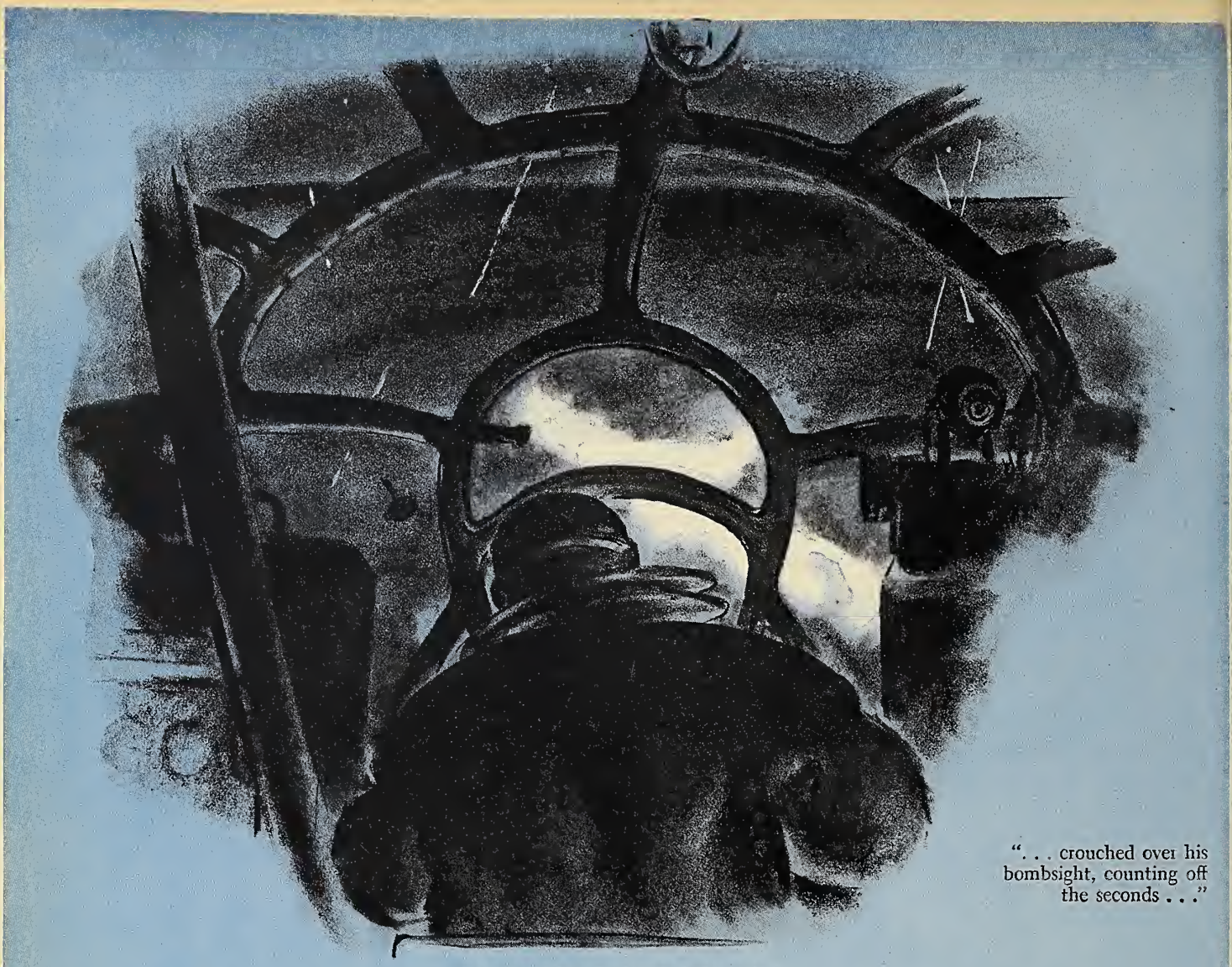


". . . crouched over his bombsight, counting off the seconds . . ."

ILLUSTRATED BY CAPT. RAYMOND CREEKMORE

From Kansas to Tokyo

BY MAJ. MILTON R. KRIMS

AIR FORCE *Overseas Staff*

This is the story of how one B-29 and its crew became operational. It could be the story of many B-29s and many crews now hitting Japan.

The Superfort grew up somewhere in Kansas. In another part of Kansas, at practically the same time, 11 men were learning to become its crew. First there was the airplane commander, a West Point graduate, class of '43. His name was Capt. Russell J. Smith. Three corporals were added as gunners: Edward Zita in the right blister, Charles E. Boland in the left blister, and Joseph P. Bohan in the tail. Later were added 2nd Lt. Robert Dean as copilot, 1st Lt. Carlysle E. Schnelle as bombardier, 2nd Lt. James E. McLain as navigator, 2nd Lt. Raymond Yeager as special equipment operator, Cpl. Sam Schulman as radio operator, Cpl. Boyd Mericle as central fire control operator, Cpl. Hayden F. Washington as flight engineer.

This was the crew. They flew navigation missions to Cuba and Puerto Rico. Once they lost an engine about an hour out of Puerto Rico, and got back with a new confidence. They went to a B-29 plant, watched an airplane being built. But always they wanted a plane of their own. Even when they began processing for overseas duty—straggling from office to office making out papers, getting sore arms from shots, kidding about infectious diseases—they still didn't have their own plane.

Then one day their airplane was sitting on the ramp. Separately, they wandered down to admire the shiny new B-29. One by one they went inside, handled controls and guns and instruments, each man especially concerned with the tools of his job.

When the time came for the overseas hop, take-off was delayed by a leak in the relief valve to the debooster.

The story of a B-29 and its crew, from a training field in Kansas to a Marianas base; then their first mission—Tokyo at low-level

Standing around on a cold, windy morning, waiting for the valve to be replaced, they grumbled about it being a hell of a way to get started.

The seven-hour flight from Kansas to Mather Field, Calif., Port of Aerial Embarkation, was routine except that No. 1 engine carburetor acted up, making it necessary to operate on auto rich most of the time. At Mather the maintenance boys installed a new carburetor and, while they were at it, replaced a cracked glass in the bombardier's pane.

The schedule was rigid at Mather—checking and processing, briefing on everything from navigation to tropical diseases. And they had time to wonder about their B-29. The flight engineer wasn't at all sure about the wisdom of keeping cowl flaps closed down to within temperature tolerance; he'd always believed a reasonably low cylinder head temperature was easier on the engines. But he appreciated the cruise control charts. Time and again he'd been told that if he adhered to their established requirements, he would get maximum efficiency with minimum fuel consumption. The plane had been washed and steam-cleaned at Mather, and they wondered how many mph this would add to the previous speed.

From the time they left Mather to arrival in Hawaii, the radio operator, navigator and engineers were constantly busy; pilot or copilot occasionally adjusted the turn control on the automatic pilot to correct a tendency to drift to the right. The navigator was determined to find Hawaii on no more than three readings. The airplane commander, the group flight engineer, 1st Lt. John L. Stevens, who was flying with them as a passenger, and the flight engineer were holding within the exact specifications of the cruise control charts and flight plan.

A perfect landing was made at John Rodgers Field in Hawaii. They felt better with a long overwater hop behind them.

On their way again, 43 hours later, there was a noticeable change in the crew. For one thing, they were no longer troubled by overwater flying, although Kwajalein was a landfall over 10 hours away. About 200 miles from Kwajalein, the navigator called for a slight change of direction. Then, once again, Lieutenant McLain called his shot. Kwajalein was straight ahead, a hairpin-shaped atoll, and the pilot brought them in with another perfect landing.

The next morning there was some trouble with the oil pressure gauge and the men were impatient, anxious to beat the noon deadline that would keep them another day on Kwajalein. Then at 1116 they took off for the last step on their journey to an island in the Marianas.

For the next six hours the men speculated about their future home, about living conditions, climate, but mainly they wondered about their first mission. When would they fly it? What would it be like? They felt ready for a mission and, thinking back, they tried to remember what they had learned on this journey. The navigator had learned to trust his instruments. He had flown day and night over water and he knew he had both the confidence and the tools to guide the airplane to any desired destination. The men knew that an airplane must be kept as clean as possible inside and out; washing and steamcleaning the plane had added five to seven mph to their airspeed. The engineer was finally convinced he must run his engines at the indicated maximum temperatures. And pilots and engineers had proof that the airplane should be flown according to specification of the cruise control charts.

The voice of the navigator came over the intercom. "Navigator to pilot. You should be seeing that island any minute now."

It was only their second day in the Marianas when one of them said, "I came over here to fight and they've got me going to school again." The whole crew was annoyed. They had taken their plane across 6,000 miles of water and were ready to take her into combat and here they were in school—eight hours a day of it.

Maj. Gen. Curtis Lemay, Commanding General of the XXI Bomber Command, put it this way, "The idea that training days are over when a crew arrives in a combat zone is absolutely false. The basic training in the States is excellent, but it can't help but be a little behind because we learn new things every day over here and we can't possibly get the information back fast enough. Training continues right through combat operations, letting up only a little in direct ratio to the combat experience of the crew."

". . . another day on Kwajalein."

The crew of this B-29 went to school for 10 days. General Lemay gave their class its first lecture and introduced them to air discipline. He said crews must reach a point of proficiency where procedures become automatic, must become thoroughly at home over the target, know the way there and back as well as they knew the way to the mess hall, must learn to fly exactly as briefed.

On the fourth, sixth, eighth and tenth days of school they flew practice missions, and it felt good to get back to their plane. They dropped bombs on Jap-held islands, and the first time they returned a little disgruntled. They hadn't even hit the target. There were all the intricate problems of allowance for turn to be solved. They were flying new and very close formations. In the States they had paid little attention to fuel consumption.

They felt differently now about the training.

Lieutenant Schnelle, the bombardier, said, "High ballistic winds really present a problem. At home you've got an average wind of about 30 mph. It's not unusual, I'm told, to run into 150 to 200 mph winds over Japan."

Lieutenant Yeager, the special equipment operator, smiled happily. "One thing I like about this school. They explain my problems to the rest of the crew."

Added Lieutenant Dean, "They say copilots in the States

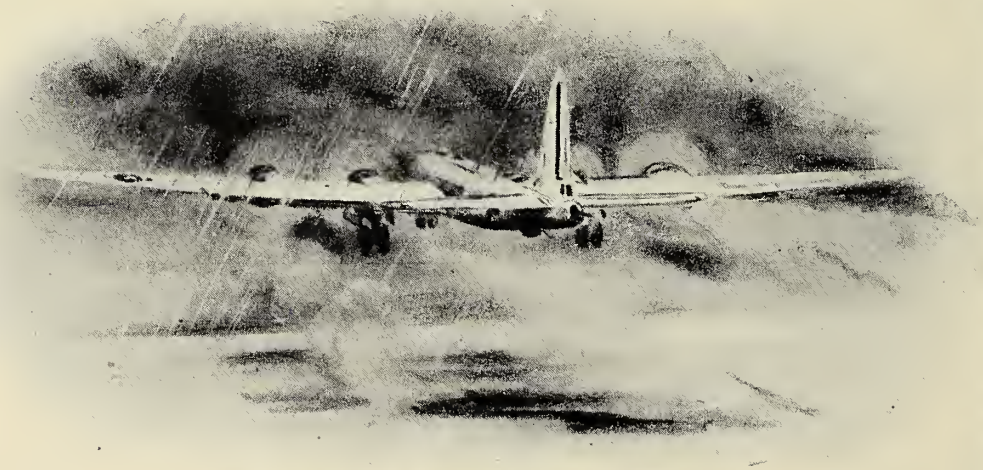
don't get enough chances to function as pilot. Here they expect us to get more time so we can lighten the load on the pilot. Suits me fine."

Lieutenant McLain, the navigator, said, "We're going to fly through all kinds of weather, fly doglegs to miss Jap islands. I got to be sure to get a fast reading as soon as we come out of an overcast. I got to make sure the pilot goes into the wind to make landfall. I got to worry about 180° wind shifts and constant altitudes on the way to the target and varying altitudes on the way back."

Precision instrument flying, almost split second timing, tight formations for perfect bomb patterns—these they found added up to air discipline. And these they thought of in terms of the first mission.

Then suddenly it came. March 8, 1945, was no different from any other day at first. They had planned to do some work on their huts, check the airplane. But they had no time for casual activities that day. Captain Smith was informed there would be a briefing for all crew members.

The briefing hut was overflowing into the white coral path. At the long end of the hut there were maps on the wall, maps of Tokyo. Smith and Dean and Schnelle and the others grinned a little; not bad—Tokyo. And then a quiet, unemotional voice was talking to them. "You will come over the target at an altitude of 5,000 feet." There was more, but for the moment that was enough. Their first mission—Tokyo—with the lowest stack at 5,000 feet.



"We're going to fly through all kinds of weather."

Then they were suddenly very busy. Col. Carl R. Storrie, CO of their group, gathered them together for a talk. The colonel had a long record of combat in Europe and he spoke with the quiet assurance of a man who knows. They listened as he told them the tricks of flak evasion, warned them about making precision turns and maintaining altitude, told them how to evade fighters. There would be some 300 airplanes over the target and each must be in its assigned place at the proper time. If not, there would be air collisions as well as planes hit by friendly bombs. And wear amber glasses so as not to be blinded by lights and flak. Finally Colonel Storrie said, "And don't go for the Emperor's palace. It's not named as a target. There's only one place for your bombs to land and that's on your target. Good luck—I'll see you all tomorrow when we get back."

They talked excitedly as they left the briefing hut. "Holy hat . . . 5,000 feet . . . incendiaries . . . 5 to 7 tons of bombs in each airplane . . . and at least 300 airplanes."

After dinner, Captain Smith and the crew returned to the briefing hut. They wanted a man-to-man briefing. Never before had a B-29 been flown at such a low altitude over an enemy target. Quietly they studied the maps, reviewed their problem.

They slept late the next day, and they slept well. A late breakfast was arranged. There was a final air-sea rescue briefing, a weather briefing. "Got a hack coming up," said Capt. Joe Byrtus. "Fifteen forty-four in thirty seconds." They bowed down over their watches. Five . . . four . . . three . . . two . . . one . . . hack."

Following a 1739 take-off, Captain Smith was guiding the plane carefully over the cliff that dropped abruptly into the blue sea. The intercom was busy. Schulman at his radio . . . Mericle, Zita, Bohan, Bolan at their gun positions . . . each had his own way of answering "RRRRodgeRRR." Somehow you always recognized them as soon as they spoke. The tenseness was gone.

Each man tested everything he could think of, tested it again. Gradually the chatter on the intercom died down and it became very quiet. The sun was setting, and it seemed the whole world was gradually turning gray. Then suddenly it was dark. All around, the darkness was crowded with airplanes. General Power, Colonel Storrie, Colonel Wheless, Lt. Colonels Mason, Martin and Strouse, Majors Baird and Evans, and others. The sky was full of rank flying with the men they commanded—and trained. As Colonel Storrie said, "The only way I can pick my lead crews is to fly with them." He had flown every mission so far.

Time passed; gradually, the values of air discipline began to show. Maintain proper altitude and airspeed and you needn't worry about other airplanes nearby in the dark. Set power according to the specifications of the cruise control charts and you needn't worry about running out of gas. Maintain a proper military organization in your crew and you knew everyone would function efficiently and calmly, quick to respond to every command. Everything seemed to be working as planned. Finally, quite incredibly, they began to feel as if this were just another flight.

It was getting pretty close now. They struggled into their flak suits. They put on their amber goggles. They seemed to be able to remember everything they had been told without even trying.

Yeager sighted land. McLain had guided the big airplane over 1,300 miles through darkness and changing weather and made landfall only 3 miles off course. Already, he was plotting the course away from the target.

The Japanese homeland was hidden under a perfect blackout. The weather, as predicted, was CAVU. They were over the I. P., turning into the axis of attack. Smith increased his airspeed and the airplane surged forward.

Suddenly, off a little to the right, there was an oblong of yellow flame. In another moment, it was crossed by another, forming a perfect X. The first incendiary bombs had been dropped on Tokyo. Colonel Storrie, flying with Captain Russell, was first in. Lt. Col. Gene Strouse, with Captain Douglas, crossed his bomb pattern.

A split second later, the darkness over Tokyo was cut by

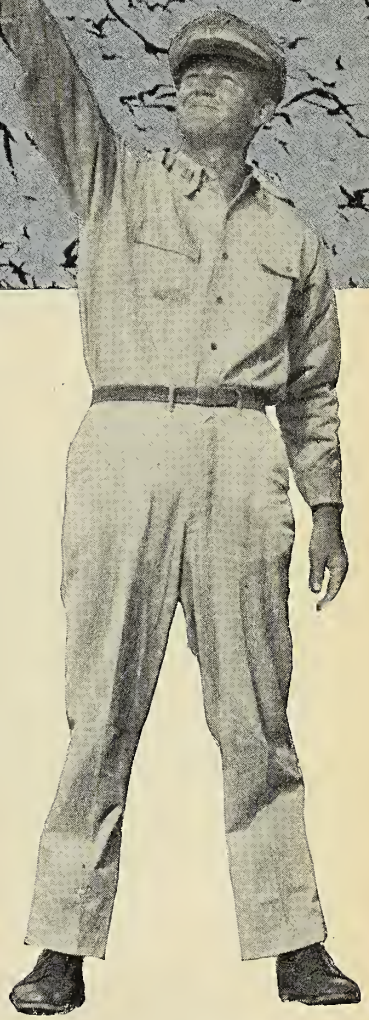
(Continued on Page 26)

Get Going, Gooney

It is always open season for "Gooney birds" on Ascension Island. The Captain shoots his Very pistol, the colored rockets scare the birds, and a safe path is opened for air traffic using this station.

Ascension's 35 square miles are covered with rocks, cinders, and volcanic lava.

The birds use Ascension as a nesting ground, creating a serious traffic hazard.



After an airfield had been carved out of Ascension Island, thousands of "Gooney birds" assembled on it and created an unusual problem. For five months each year it was extremely hazardous for planes to land or take-off after 1600 hours. All attempts to shoot the birds, smoke them out, or scare them away by dynamiting the ground failed. Then Maj. C. S. Chiles hit on the idea of firing Very pistol flares. That proved to be the answer. Now it is SOP for two men to stand near the end of a runway and shoot the flares. The birds are chased away long enough to keep the air traffic moving. ☆

Work goes on at the runways all the time. The labor is native and the methods are primitive, but together they do an important task.

Ghurkas, among the finest of native troops, load up for Mandalay.

This C-47 fuselage with thatched roof served well as base operations.

Natives are loading packages which will be dropped by parachutes.

BURM

BY CAPT. L. P. BACHMANN

AIR FORCE *Overseas Staff*

Sometimes they landed at forward airstrips, often they dropped food and other supplies while still airborne. Some of the boys who had this latter job grew tired of being shot at as they circled over enemy lines to make a drop. To keep Jap heads down, they loaded 100-pound bombs along with cargo, and shoved them out between packages of food, ammunition and PX supplies.

All kinds of similar ingenuity were required in Burma; it was rugged for the Troop Carrier and other transport men who had the job of supplying our forward ground troops—they had to contend with enemy fire, the worst terrain in the world, topheavy schedules. But today we have Lashio, Mandalay—and the capital of Burma, Rangoon. The entire operation, all authorities agree, would have been impossible if ground troops had not been able to count on us for everything from tactical and strategic air support to deliveries of replacement troops.

The 10th Air Force, stripped down principally to fighters, L-planes, medium bombers and C-47s, was assigned to support the Northern Combat Area Command—composed of Chinese divisions plus the U.S. Mars Task Force which took Lashio—and the British 36th Division which approached Mandalay from the north. Matched with this organization was the Combat Cargo Task Force given the same job in support of the British 4th Corps in Central Burma.

The entire operation was really Allied, in the most jumbled sense of the word, with Indians and Chinese loading American planes assigned to resupply British troops—with RAF Dakotas carrying even chewing gum and an occasional can of beer to Americans on the road to Mandalay.

With cargo planes flying up to four missions a day and crews working often more than 17 hours per diem, the

Much of the credit for our successes in Burma belongs to the AAF and RAF men who helped supply our troops slogging through the jungles.

Hot meals are brought to the squadrons who fly the combat cargos.

Each morning combined staffs meet to discuss next day's operations.

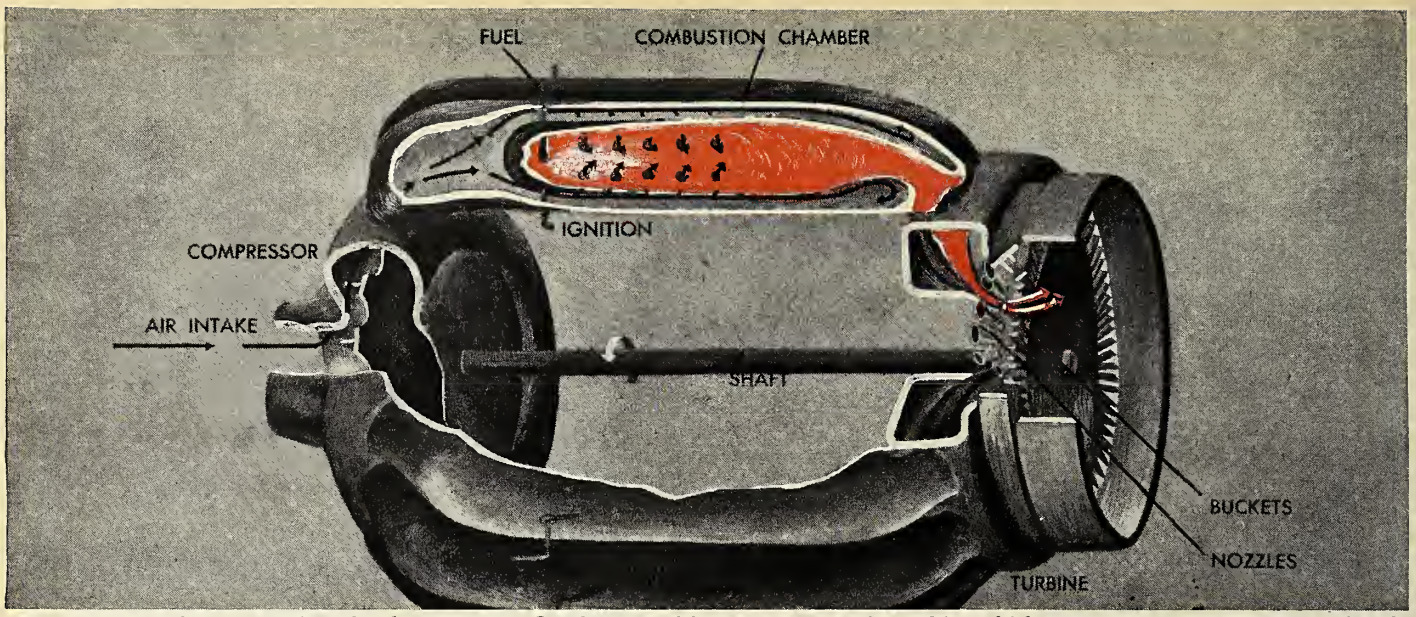
tonnage figures were terrific. Ground crews worked every night during the few hours of the 24 that the aircraft weren't actually airborne. Through their efforts more than 80 percent of all assigned aircraft were kept operational—despite impossible climate, weather and a baffling shortage of spare parts.

Aetual paeking of the eargoes was done by Air Cargo Resupply Squadrons composed of men newly assigned to the Air Force from Quartermaster, Infantry, Cavalry, Signal Corps and Merrill's Marauders. They had to separate and paek the supplies and then provide crews to fly with them and serve as kiekers—aetually shove the groeerics out the doors of the planes. It's hard work, sometimes dangerous, and many of these non-rated men have aecumulated morc than 1,500 flying hours. Some of them have been lost through the open door when their plane took a sudden lurch; others have been hit by Jap bullets. One corporal

(Continued on Page 56)

What looks like a crap game is really a study of briefing maps.

Loading and unloading of the C-46s is done by a British outfit of native Indians. Between work they cool off in this convenient pool.



Cutaway view shows operation of turbo-jet engine. Combustion of fuel-air mixture spins turbine which rotates compressor by means of shaft.

GROWING PAINS OF JET

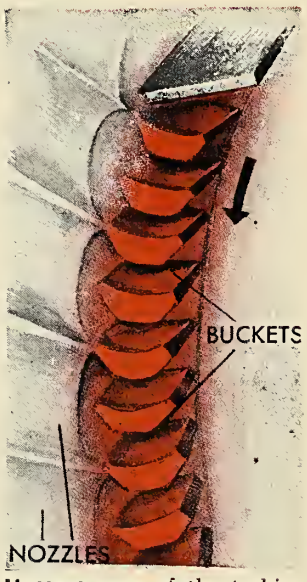
BY MAJ. ROBERT V. GUELICH
AIR FORCE *Staff*
ILLUSTRATED BY CPL. MILTON J. WYNNE

In early March, 1939, Lt. P. H. Robey took a YB-17A up to 25,000 feet in a test run and clocked its speed at 311 mph. This was 100 mph faster than a B-17 had ever flown, even faster than any of our fighter aircraft had flown at that altitude. The test flight was an astounding performance for those days, but no one thought of it as a milestone in the development of jet propulsion in this country. Yet, indirectly, that's just what it was.

If that test flight had been unsuccessful, all orders for turbo-superchargers on B-17s would have been cancelled, for it was the turbo that produced the 100 mph margin in speed—and in early 1939 the turbo-supercharger definitely was on the spot. At the time of the flight, orders for turbos on B-17s had already been technically cancelled. The paper work had been initiated and forwarded to Washington. Boeing Aircraft and the AAF had lost faith in the turbo. For 20 years the AAF had struggled with the gadget only to have one disappointing flight test after another. The Robey test used a turbo that was equipped with a new regulator, the final hope for assuring reliable performance.

As soon as the B-17 rolled to a stop after the record-breaking flight, the telegraph wires to Washington began to sizzle. Headquarters read the test results, threw the cancellation papers in the waste basket and issued a directive that all AAF high altitude bombers should be equipped with turbo-superchargers from that date on.

The pendulum had swung and the turbo-supercharger had been saved from the junk pile. Significant? Look at the turbo's record in this war—its contributions to high altitude performance, its application not only on the B-17 but on planes like the B-24, B-29, P-38 and P-47.



Hottest part of the turbine are turbo-wheel buckets that receive blast of hot gases.

Rejuvenation of the AAF's turbo-supercharger program meant more than altitude superiority for our heavy bombers. It meant that development work on whirling red-hot gas turbine wheels had been given a new impetus. Key to the supercharger program had been the development of metals that could withstand the high temperature stresses of these turbine wheels. That's where jet propulsion comes in, for this also was the key to jet engine progress.

The turbo-supercharger and a turbo jet engine might be regarded as birds of a feather since they both convert hot gas into mechanical work through a turbine wheel. The difference is that the turbo jet generates its own heat and converts it into thrust while the turbo-supercharger depends on the conventional engine for its supply of hot exhaust gas and does not use it for primary jet thrust. The turbine wheels of both must withstand very high temperatures under extreme centrifugal stress. Both drive compressors directly from the turbine wheel shaft. But the compressed air of the turbo-supercharger is ducted back to the carburetor of the conventional engine, to keep the engine operating at sea level horsepower while the compressed air of the turbo jet unit is ducted into a combustion chamber, where it is mixed with fuel and burned to produce the hot gas that turns the turbine wheel and then exhausts through the tail pipe to impart forward thrust.

Although the metallurgical problem connected with the turbine wheels had been licked to a great degree by the time the Robey test flight was made, it is anybody's guess as to what our jet engines might be capable of today had the turbo-supercharger program been abandoned in 1939. But to get the story we have to start at the beginning.

The jet engine developed in this country must withstand high temperatures and stresses of 34,000 times the weight of each turbine wheel bucket. To realize just what that means, consider that the internal combustion engine can be cooled to operate efficiently with metals that have to withstand temperatures of less than 600° F, and that its stresses are nothing like those common to the jet engine. The reason, of course, for the tough requirements peculiar to jet propulsion is that power of turbo jet engines is increased by increasing the combustion (hot gas) temperatures.

To harness these temperatures before the gas cools off, combustion chambers are placed as close to the turbine wheel as possible so that maximum amount of heat energy can be squirted against the turbine buckets. Therefore, the hotter the gas that strikes the buckets, the greater will be the efficiency of the engine. Although combustion temperatures can be raised to over 4,000° F, the fuel-air mixture in present turbo jet engines must be leaned out to burn at the top operating temperature limit of the alloys in the turbine buckets now being used.

Without such alloys we would be compelled to compromise on the efficiency of the jet engine, as did the Germans. In their Junkers 004 gas turbine engine (ME262), for example, the Germans utilized aircooling and specially coated metals to hold operating temperatures down to a 1,300° temperature range. They have to hold the heat down because the metals in the Junkers 004 won't stand up. This means a sacrifice in the efficiency of their jet engines.

For more than two decades America's leading industrial metallurgists have been concentrating their research on development of high temperature alloys that could withstand the stresses of hot turbine wheels. The search for high temperature alloys was stimulated primarily by the AAF development program of the turbo-supercharger. This program was kept alive by a handful of men who refused to lose faith when time after time the turbo-supercharger would overheat and throw its buckets out of the turbo-wheel. And these men knew the problems they were tackling in the turbo-supercharger were giving them the answers that would pave the way for successful development of an efficient gas turbo aircraft engine. But that is going a little ahead of our story.

Basic research in the hunt for high temperature alloys goes back to the last war and to Dr. Sanford A. Moss, gas turbine expert for the General Electric Company, one of the nation's largest turbine manufacturers. Dr. Moss designed a simple type of gas turbine to compress air for high altitude operation. This was the turbo-supercharger. Under the sponsorship of the National Advisory Committee for Aeronautics, Dr. Moss first had explored the operation of the 1917 turbo-supercharger of the Frenchman Rateau. Then Dr. Moss came through with the basic turbo-supercharger as the AAF knows it today.

First altitude test of this turbo was on top of Pike's Peak in the late summer of 1918. On a specially rigged dynamometer test stand, the turbo was hooked up with a 350 horsepower Liberty engine. Altitude was 14,109. Without the turbo, the engine turned out only 230 horsepower, but with the turbo, sea level (356) horsepower was pulled from the engine. These results were encouraging enough to continue the experimentation program despite the dropping of most war projects with the signing of the Armistice.

One year later, in September 1919, the first successful flight test of the turbo-supercharger was made by Maj. R. W. Schroeder in a LaPere biplane. Up at 18,000 feet, the engine's coolant supply of water gave out, forcing Schroeder to glide back to earth and make a dead stick landing. Less than six months later, Schroeder successfully flew to 36,160 feet altitude, where his oxygen supply failed. His plane plummeted at the rate of 300 mph, but Schroeder regained consciousness and pulled out at 2,500 feet.

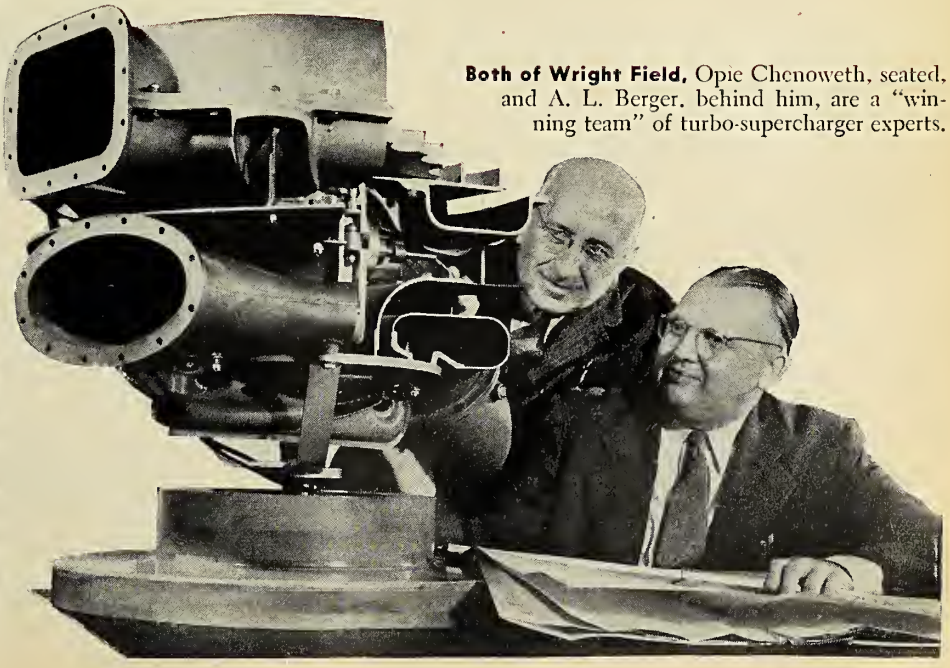
All of these flights were precarious because equipment had not yet been perfected for such altitudes, but the results of turbo performance were encouraging, although dwindling appropriations threatened to force abandonment of turbo-supercharger development.

Fortunately, the AAF had an ex-Army man by the name of A. L. Berger who had fallen in love with the turbo-supercharger. Convinced that every airplane should have one, "Doc" Berger began hooking the few available turbos onto everything that would fly. When the unit disintegrated in tests at high operating speeds and temperatures, Doc moved it from in back of the propeller to the side of the engine. Such compromise cooling methods, in the absence of high temperature metals, had to be adopted to make the turbo practical.

Parts being used were principally iron until the introduction in 1922 of Silchrome No. 1, a chrome-nickel-molybdenum alloy that could withstand high stresses at temperatures over 1,100° F. This was used for the turbine

(Continued on Page 56)

Development of metal alloys that could withstand the high temperature stresses of the turbo-supercharger's hot turbine wheels solved a basic jet engine problem



Both of Wright Field, Opie Chenoweth, seated, and A. L. Berger, behind him, are a "winning team" of turbo-supercharger experts.

FROM KANSAS TO TOKYO

(Continued from Page 20)

daggers of searchlights. They sliced up and down, searching the high altitudes for airplanes that were thousands of feet lower. They slashed across the sky, came closer.

Smith looked straight ahead, never deviating from course. Bob Dean leaned a little to the left, watching, adjusting altitude. Schnelle crouched over his bombsight, counting off the seconds on his stop watch. There were four bursts of flak near the tail, some heavy flak ahead, low, inaccurate. But the searchlights were coming closer. Washington never turned from his instrument panel.

Another oblong of flame spread over a part of Tokyo. And at the same time light from a searchlight flooded the cockpit. All of a sudden it went out . . . and a few moments later an airplane spouting a tail of blue flame shot past and up at a terrific speed. No searchlight picked them up again, only once had been enough to teach Smith how to avoid them. The flak improved as they made their turn around and away from the target. Bohan, in the tail, spoke very steadily. "Night fighter coming in at six o'clock." They waited for the burst of fire, their guns tracking him as he came within range. The Jap veered off. To the right, a B-29 was coned in a pyramid of searchlights. Somehow, they forgot their own danger, begged for her release. A great ball of fire plunged towards them, then dipped under them. A B-29 burns big at night.

The searchlights ringing the city frantically searched the sky. Ack ack ran in yellow and red and white bursts in desperate pursuit of targets. And through this pattern flew some 300 B-29s, each maintaining a planned course, speed and altitude.

They were away from the target now, looking back at the growing fire that was sending a faint streak of red to thin clouds 10,000 feet above. They watched sudden bursts of new fire added to the old. And even as distance made the fire grow smaller, a great plume of black smoke grew higher and higher over the city.

It was a beautiful fire.

They chattered over the intercom, excited now by the spectacle below and behind. But they were still over Japanese land and they were abruptly quiet when Zita broke in with, "Flak below." A few moments later Boland called, "Night fighter coming in at four o'clock." Smith called for auto rich. Seconds passed and they were like hours. "The crazy guy is blinking his lights," said Boland.

Mericle's voice was a little bored. "Two bits says there's another fighter at about five o'clock." There was. The one blinking his lights was probably acting as a decoy, trying to draw fire so the other could shoot into the blaze of the B-29s guns. There was no shooting. The Japs went away, probably thoroughly annoyed at the unwillingness of the stupid Americans to fall into a trap.

So at last they were on the way home from their first mission. Neither the airplane nor its crew had been hit. But it was a long way home over nothing but water. Smith checked McLain, got the course. Then he checked with the flight engineer. Gas? Hell, they had plenty of gas to get home. In fact, their fuel consumption had been a little less than predicted in the cruise control charts.

For a while they chatted among themselves.

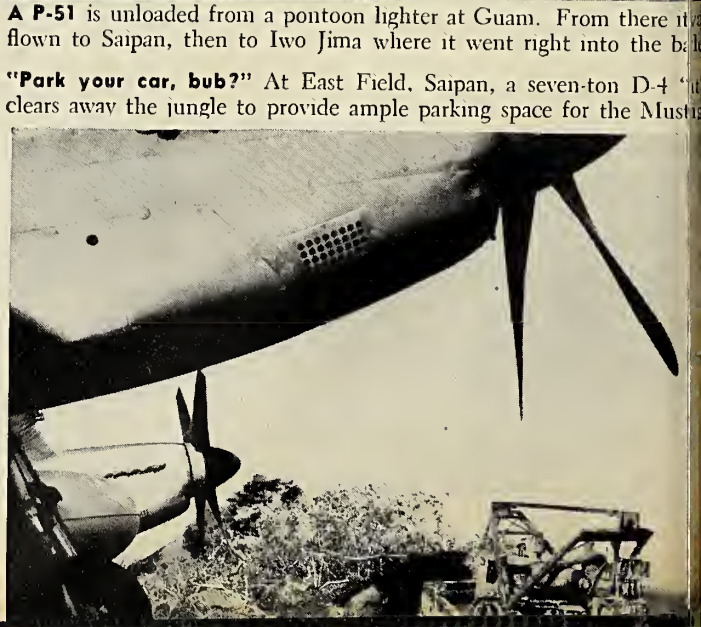
Then it became very quiet, and there was only the roar of the four engines taking them home. Hours passed. The clouds began to turn grey with the first light, then a brilliant white as they were touched by the morning sun.

Bob Dean looked at the light and said, "This is the most beautiful morning I've ever seen." ☆

This Navy aircraft carrier was made into a floating Army airfield [illegible] it brought the Mustangs from Hawaii to Crote Bay, Guam, in Feb[illegible]

A P-51 is unloaded from a pontoon lighter at Guam. From there it [illegible] flown to Saipan, then to Iwo Jima where it went right into the ba[illegible]

"Park your car, bub?" At East Field, Saipan, a seven-ton D-4 "[illegible] clears away the jungle to provide ample parking space for the Musta[illegible]



PACIFIC DEBUT

These Mustangs get practise run over Saipan before they are moved up to the fighting at Iwo.

When our "Sleeper" plane, the P-51 Mustang, was introduced for the first time in the Pacific, the Japs apparently mistook it for their Tony fighter. This little reeognition blunder resulted in one of the most spectacular individual aerial accomplishments in the Pacific war. It happened in northern Luzon, when Capt. William A. Shomo, commanding offieer of a P-51 tactical reeonnaissance squadron, and his wingman, 2nd Lt. Paul M. Lipscomb, spotted a Jap Betty escorted by 11 Tonys and a Tojo. The two AAF pilots eased up to them without arousing suspicion, and shot down five Tonys before the remaining Jap planes even broke formation. In three sweeps, Captain Shomo knocked off six Tonys and the Betty; Lieutenant Lipscomb, in a couple of passes, got three more Tonys.

There are several reports of unsuspecting Jap pilots waving in a friendly fashion just before being shot down by a P-51. It was a good game while it lasted, but the Jap finally caught on. This costly recognition mistake is the reason announcement of the Mustang in the Pacific was held up several months.

Early in April, long-range P-51s from Iwo gave Tokyo spotters a new recognition problem—and the Jap aerial defenders a new combat hazard—by flying escort to Marianas-based B-29s in a strike against the island capital. Jap reaction was less than enthusiastic as the P-51s strafed ground targets. ☆

The second P-51 to land at Iwo hit a soft spot in the airstrip. Mechs start repairing damage.

YOU'RE THE UMPIRE

BY MAJ. ALFRED FLEISHMAN
Office of the Air Surgeon

S/Sgt. Dave Arcie, looking up from his Army hospital bed at Oran, watched every expression on the faces of the medics. He couldn't hear what they said, but he knew their decision meant whether he spent the rest of his life with one leg or with two. To him it meant the difference between being a whole man or no man at all. There was no in-between.

For weeks his leg had been in a east, ever since they pulled him out of the ball-turret of the B-24, back from a raid over Romania, with his leg full of flak.

One of the medical officers came over to Dave's bed. "Sergeant," he said, "We've done everything we can, tried everything we knew, but I'm afraid we must amputate your leg. If we don't do it right away, infeetion may spread and that would make matters considerably worse. We'll save as much of your leg as possible . . ."

The doctor was kind, he was sympathetic, he was reassuring. But no matter how you dress it up, letting a man know one of his legs has to be eut off is no pleasant job.

The sergeant begged the medical offieers to wait a little longer. Maybe the leg would heal after awhile. Maybe something might happen and it wouldn't have to come off. But the doetor shook his head.

Sergeant Arcie's leg was amputated a few inches below the knee. From a medieal point of view it might have been worse, much worse, but they eouldn't make Dave believe it. "I'm a eripple and I know it," he kept mumbling over and over. When they told him he could still do a lot with what he had left, he just stared. It was as if the medics had amputated his spirit. Dave was a concrete mixer before he joined up to be a gunner in the Air Forces. You can't mix eoncrete with only one leg—that's all he knew.

They shifted him from one hospital to another, finally to a large Army medical center baek in the States. Here he learned how to get around on crutehes, but he had no interest, no spark. What they told him were just words. He could do a lot of things, they said. But it didn't register.

One day they told him he was ready to be fitted with

Sports and games play a big part in AAF Rehabilitation, but the big contest is the patient vs. himself, with the outcome dependent on his own decision

an artificial limb. Sergeant Arcie wasn't interested. "I'm a cripple and I know it," he said. "Might as well walk on crutches, I'm getting used to them." But the doctors kept working on Dave Arcie, and reluctantly he agreed to give it a trial.

When Dave had learned to walk with his artificial limb, he was sent to an AAF Convalescent Hospital. It wasn't bad, and everybody treated him fine—but what the hell! He saw the big gymnasium and the athletic fields, but he couldn't see them for him. Then one day they took him up to the 70-yard circular track in the gym. He thought they were just going to show him the works. When the PT officer told him he was supposed to run around that track, he couldn't believe it. "This guy must be nuts," Dave thought. "Run!" he said. "Hell, I've got all I can do to walk! Look." And he proved it with a demonstration of his heavy limp.

The PT officer wasn't impressed. "C'mon, we'll show you a few tricks." Well, Dave figured, he was still in the Army, and when the Army makes up its mind there's no use trying to buck it, let alone trying to figure it out.

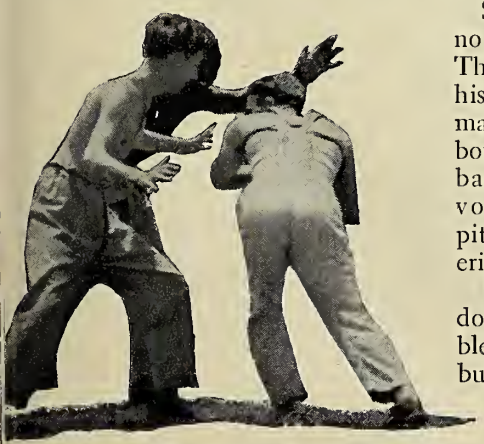
They went to work on Dave. Here's how you use your hip to get the most out of it; here's how you follow through; this is the way to get better balance; take these exercises for your hips; your legs; your stomach; swim; learn to golf; bowl; play ping-pong.

Didn't the damn fools know he was a cripple?

Dave finally made it around the circular track in 114 seconds. When they had him post his time next to his name on a board, he studied the board, a sort of racing form and saw that many others no better off than he had started about the same way and gradually had cut their time down. That 114 seconds began to bother him.

In a few days he was ready to try again. When he found he could lop off a few seconds from his previous record, he really went to work on it, even got excited about it. Not that he felt he would ever be any good, but it was a kind of challenge. Those figures on the scoreboard got under his skin. As Dave began to cut his running time down, something began to happen to him. He perked up a little, began to haul other guys over to the score board to show them how he was doing. He even got a few of them to race against him.

Soon Dave found he could shake a pretty good leg at badminton, even tennis, could bowl a better than average game. He began to laugh again. His spirit went up as his track time went down. One day he hit 16 seconds for the 70 yards.

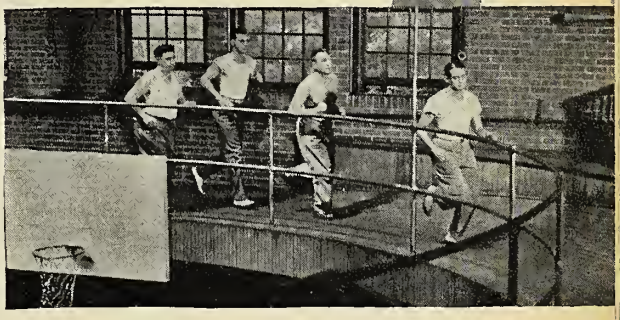


Sgt. Dave Arcie was no longer a "cripple." The word wasn't in his vocabulary. No man who can run, bowl, swim, play golf, badminton, tennis, volleyball, baseball, pitch horseshoes, is a cripple.

Medical science had done everything possible for Dave Arcie, but it remained for Dave to help himself. He had to play a big part, the final part in his own recovery. Athletics and recreation had helped him regain his spirit, had provided him with the means by which he could recapture the group feeling he needed so badly.

There are plenty others like him.

1st Lt. Carl Watkins was a pilot who had flown over the hump in China more times than he liked to count. On one of the trips the plane caught fire and blew up. Watkins hurtled down to earth from 500 feet with no parachute; the rest of the crew had been killed in the explosion.



Lieutenant Watkins had a broken back, two broken legs and was badly burned. When, months later, the doctors had completed an excellent repair job on the lieutenant, they shipped him to an AAF Convalescent Hospital. When he arrived his back was stiff; he didn't have enough strength to carry a bag. Bending down was out of the question. He didn't think he could ever do it again. At the hospital Watkins didn't care much about anybody and didn't think anybody cared much about him. Just let him alone, that's all he asked.

It was difficult for the hospital staff to get Watkins interested in anything. He was becoming one of those borderline discipline cases that the CO doesn't quite know what to do with. The PT boys found out that Watkins showed a fair interest in swimming. They started with that, got him in the water. He made 20 yards the first time out, then asked for help to be pulled out of the water.

But now he, too, had a record. The spark was there. It was easier to get the lieutenant back in the water the second time. The third time was still easier. The fourth time he went himself, for now he could see his own improvement.

One day 1st Lt. Carl Watkins raced up and down the pool against time for 240 yards. By this time he could do 25 sit-ups, could bend down and come up 10 times with a 10-pound weight on his neck. Reviewing these accomplishments, he began to wonder what the hell he was doing in a hospital. He walked out carrying 45 pounds of baggage.

Sgt. Joe Harlan was a gunner who had a pretty rough time of it overseas. He flew 47 missions in one of those planes to which flak and machine gun bullets seemed abnormally attracted. On almost every mission they were hit. He saw his friends go down all around him—and most of

the time no parachutes could be seen to open. On several occasions men were taken out of his plane who would never fly again. They were dead.

Finally he couldn't take any more. They sent him back to an AAF Convalescent Hospital in the States. He was nervous, jumpy, full of tension. He seemed to remember everything that had happened, and at night it all reappeared in vivid detail. In the convalescent hospital he wanted only to go off by himself in a corner. When he talked, which was seldom, he had trouble with his speech and stuttered considerably. He made no bones about letting people know that he didn't want to be bothered.

The psychiatrists worked with him and he gradually showed signs of improvement. But his tenseness and stuttering remained. The personal physician, to whom he was assigned, thought he ought to play. He was persuaded to get on a volleyball team. Harlan played without interest at first. His timing was bad, his coordination practically non-existent. Often he found himself swatting at the ball after it had already gone over the net.

But when his team lost, Harlan didn't like it and he worked harder trying to improve his own game, finally began to make a few scores himself. Soon he reached the yelling stage. "Sock that ball, sock it, hit it!" He could be heard a city block away. When he played, he found the stuttering almost gone. When he was hard at it, he could yell and speak without stuttering at all. His improvement in the game became noticeable—so did his spirit. He seemed to have taken a new lease on life, became more sociable, could sit around with the rest of the fellows instead of going over in a corner by himself.

T/Sgt. Walter Werne was a top turret gunner, shot down on his 51st mission. He was sent back to the States, to an AAF Convalescent Hospital, with no visible scars but full of tension, shakes and tremors. He was hostile to the point of being almost violent when any one got in his way. When you could get him in a corner to talk, his conversation was full of gripes. The Army this, the Army that, what a raw deal he got and what a soft life the civilians who "sat out the war" had. Werne made it plain to everyone, including his personal physician, that from now on he was a passenger and was riding free on the merry-go-round. As long as he was going to be nervous all his life, according to his own reasoning and diagnosis, there wasn't much use in doing anything except just sit and be nervous.

Getting Werne interested in anything seemed like an impossible job. But the doctors didn't give up. He stood 6 feet 2 inches in his stocking feet and the PT boys thought he might make a good basketball player. They quizzed him on it and found that back in high school he used to jump center. Well, a center was just what they were looking for. Werne figured it was a gag, but he'd go along with it. He broke into the line-up and within a few minutes, in spite of himself, was working like hell trying to score, block, pass and generally be all over the court at the same time. When the game was over he could hardly talk. It wasn't from lack of desire, but because he had yelled himself hoarse.

Sergeant Werne didn't work out his trouble right away, but when the writer saw him last he was well on his way and was constantly on the lookout for men with the same type of troubles he had had and was yanking them into the game.

Sports and recreation do not replace medicine, far from it. But they do play an important part in eventually motivating a man to get well under his own power. What is there about competition either between others or within the man himself that relieves tension, strain and uncertainty?

Let's go back a little. Throughout his training in the Air Forces, the aircrewman has been inbued with a "team spirit." During the process of welding him into a fighting group, he found a loyalty to his fellows that stood him in good stead. They trained together, flew together, fought together.

When one of the gang got hurt or sick, necessitating his removal from the outfit, almost immediately he began to feel a decided loss. He didn't belong anymore and his dependency on the group was brought home for the first time. He might be with a lot of other men, but he still felt alone.

This group feeling must be replaced and, in the process, a man's sense of proportion and balance restored. When airmen feel that they can play together again, are still part of the team, belong to the group which looks to them for a contribution, then they know they can work together once more—and that's what AAF rehabilitation is designed to do. ☆

AIR BLITZ AGAINST JAPAN

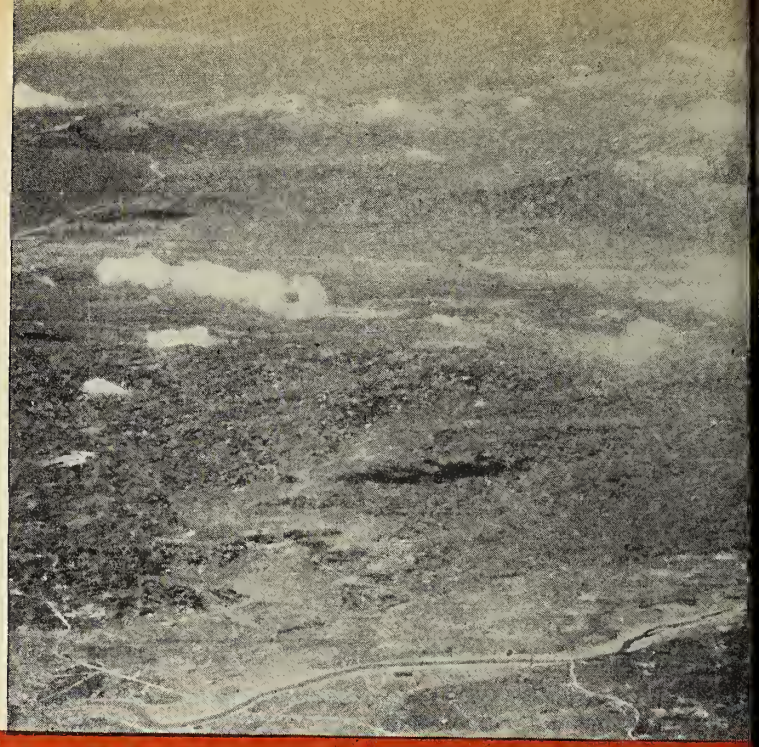
By an Air Force Overseas Staff Correspondent

ILLUSTRATED BY SGT. LOUIS S. GLANZMAN

The real aerial blitz against industrial Japan began in early March with a series of low level attaeks that also marked a revolutionary change in the taeties and employment of our B-29s in the Pacific.

For six weeks preeeding March 9th, B-29s of the 21st Bomber Command, flying at 25,000 to 30,000 feet, had been running into adverse eloud conditions and winds of from 120 to 180 knots an hour. In those six weeks it had been difficult to judge visually the results beeause altitude and elouds made visibility poor. This uncertainty indicated the wisdom of deviating from the established operating proeedure of high altitude bombing.

Many long hours were spent eonsidering the various problems. First, low level would offer weather advantages: winds would vary between 25 and 35 knots, lessening the problem of excessive drift on bombing approaehes. Cloud conditions were bound to be better. There would be less strain on the engines, thus simplifying maintenanee problems. Perhaps most important, low level attacks by eliminating elimbs to extreme altitudes would decrease fuel eonsumption, thus permitting greater bomb loads. On the other hand, bombing at lower altitudes also would give the enemy eertain defensive advantages, if he was prepared to exploit them. There would be the danger of more aeeurate antiaireraft fire, more extensive fighter opposition. These, in turn, presented the question: should the strikes be at night or in the day time?



The decision was that widespread fire could paralyze Japan's industries. B-29s of the 21st Bomber Command went in a

Then there was the problem presented by the physieal makeup of the target areas—Tokyo, Nagoya, Osaka, Kobe. Colleetively, these eontained a preponderanee of Japan's most important war industries. Here were the faetories making the weapons, equipment and supplies needed by the Japanese to earry on the war. Here were the ships, shipyards and the railroad facilities, the warehouses eontaining raw and finished material.

The signifieant aspeet of these eities—as seen from the air—was the solid mass of one and two story houses, over 90 pereent flimsy wooden struetures, with only a relatively small proportion of multi-storied modern buildings. Inside these small houses were unknown thousands of little shops, the "invisible industries," all selling their produets to faetories on a piece-work basis. For example, former toy shops were finishing and assembling engine components; former household eutlery shops were produeing components for preeision instruments. There were also many "shadow plants," small enterprises elustered around larger factories and serving as added sourees of produetion. In 1939 Tokyo alone had 15,000 such shadow plants, eaeh employing five or more persons. These invisible industries and shadow plants, dispersed through large eities, presented almost impossible individual targets. Only by widespread fires could they effeetively be destroyed.

After eareful analysis, it was deeided to make a low level ineendiary night strike against the most densely populated area of Tokyo. One of the most important eontributing faetors of this deeision was its great element of surprise. The Japanese seem to have little resilieney; when they establish a defensive doetrine they appear slow to ehange it. If the Tokyo strike should be sueeessful, Nagoya, Kobe and Osaka would be hit in rapid sueeession on alternate nights. It was a daring plan, ealling for maximum effort and maximum eourage.

On March 9th, the Superforts of three wings of the 21st

B-29 bombstrike on Tokyo. Twelve hours later fires had burned out area of 15.8 square miles. Incendiary bombs were dropped.

Bomber Command were on their way to Tokyo. It was a good night; the weather exeellent. The target was a highly congested rectangular area, approximately 10 square miles, with a population density of 103,000 people per square mile, perhaps the highest in the world.

Tokyo, one of the world's three largest cities, had a population in 1940 of about 7,000,000. Also Japan's leading industrial city, it contained such key war industries as machines and machine tools, electronics and preeision instruments, petroleum, aircraft and aircraft parts. It was the terminus of practically all the main railroads on the island of Honshu, as well as the administrative seat of government and of the great industrial concerns comprising Japan's war maehine. The target area included such vital centers as the Joban, Ueno and Central Tokyo railroad stations, the Marunouchi Telephone Exchange, whose lines go out to all parts of the nation, governmental districts, and the Army and Navy administrative planning headquarters.

From the moment the lead airplanes came over the target, the mission was intensely dramatic.

Japanese searchlights combed the sky at the expected altitudes. The first two airplanes dropped their bombs to form a perfect, blazing X. Two hundred and seventy-seven B-29s followed to spread that X into one of the greatest fires in history. Flak was spotty, light and inaccurate to accurate and intense. Automatic weapons' fire was low, and heavy gun fire was mostly high. Night fighters were timid, kept away. Apparently the magnitude of the defensive problem was too much for the Japs.

The flames, started in the northeast section of the target area, were fanned over the area by a 20-knot wind. Twelve hours later, fires had burned an area of 15.8 square miles. Less than 15 percent of the area escaped destruction.

There is no way of knowing exaetly how much of Tokyo's invisible industry was destroyed. What is known makes an interesting list, much too long to be itemized here.

Photo reconnaissance indicated the Kanegafuchi Aircraft Parts Plant was severely damaged, Japan Machine Industry destroyed, as were the Tokyo Gas Co., Nippon Electric Wire and Cable Co., Nisso Steel Co., Sakurada Engineer-

ing Works, Rising Sun Petroleum Terminal, Oriental Weaving Co., Shiodome Freight Yards, Susaki Doekyards of the Ishikawajima Shipbuilding Co. A good target severely damaged was the Steam Engine and Rolling Stoek Manufaeturing Co., produeing freight ears and rolling equipment known to be eritieal items in the Japanese eeonomy. The Army Provisions Depot was destroyed. The great Tsukiji market and wholesale warehouse, most important wholesale food outlet in the area, was praetically destroyed. To repeat, these were only a few of the plants destroyed. At this time there is no absolute way of reducing to statistieal terms the millions of man hours lost to Japanese industry.

The Japanese were given no time to rest. Two nights later, Nagoya was hit by nearly 300 B-29s. The target area was a triangle three miles long on each side. Population density in this area ranged up to 75,000 per square mile. Nagoya was one of the three largest industrial areas in Japan, and was believed to be the largest eenter of Nippon's aireraft industry. It was estimated that 25 pereent of the population was engaged in some phase of aireraft produetion. Here, too, the Japanese system of household industry and shadow plants prevailed. In addition to aireraft, Nagoya industry produeed machine tools, bearings, railway equipment, metal alloys, motor vehieles and processed foods.

This eoneentration of 40 to 50 pereent of Japanese produetion of aireraft and combat aircraft engines merited a maximum dispersion of destruction.

Aek ack and searehlights were somewhat better here than at Tokyo. The B-29 erews reported phosphorous bombs and strange green balls floating down from about 6,000 feet. Evidently the Japs were beginning to open their detensive book a little, but it seemed to reveal no sueeessful weapons. The Aiehi Aireraft Works, Atsutaa Faetory of Nagoya, Daido Electrieal Steel, Nissan Chemical Plant, Hokoku Maehinery Co., and Sumitomo Light Metals Plant were among the important installations damaged.

Osaka was next. The target area was about 10 square miles. Prior to the present war, Osaka had grown to one of the most important industrial eities in the Far East. Here also were the household workshops and shadow faetories, perhaps more densely eoneentrated than in any other eity in the world. Osaka was noted for its heavy industry whieh ineluded shipbuilding, iron, steel and rolling stock works, as well as nonferrous metal enterprises, speeifieally eopper and aluminum. It also produeed aireraft propellers and governors, munitions and ordnanee, textiles, speeial steels, electrical equipment, instruments, maehine tools, anti-friction bearings. It was the third port of Japan.

On the 14th of Mareh, nearly 300 B-29s earried 1,733 tons of ineendiary bombs to Osaka, delivered from 5,000 to 9,000 feet. Onee again, enemy defenses were ineffeetive. Total damage to the enemy amounted to 8.1 square miles. Heavy industry was hard hit. Among the plants put out of business, either permanently or temporarily, were the Kubota Iron and Maehinery Works, the Kujo Power Plant, the Osaka Gas Co., Nakayama Steel Mfg. Co., Kurimoto Iron Works, Osaka Metal Industry Co., and the Hatsudoki Engine Works.

Early on the morning of the 17th, Kobe heard the air raid warning signals. It must have seen the fires of Osaka three nights before. It must have known what to expeet. It was Japan's sixth largest eity, its prineipal port. Here also was Japan's largest eoneentration of shipbuilding and marine engine plants Here the Sanyo main rail line from Shimonoseki at the western tip of Honshu joined the Takoido main line west of Osaka and Tokyo. A national highway ran through the eenter of the eity. There were also steel, railway equipment, maehinery, rubber and ordnanee plants, all elosely integrated with Kobe's transportation aetivities.

Over three-hundred B-29s dropped 2,328 tons of ineendiaries on the urban area of Kobe. They burned a total of 2.91 square miles. There were many night fighters seen, but the few attaeks made were unaggressive or poorly exeeuted. The Kawasaki and Mitsubishi heavy industry areas were still obseured by smoke two days after the strike.

It was as if a vast, fiery tidal wave was sweeping across the great cities of Japan. There was no hiding from it, no stopping it. For the Japanese there was only the hope it would burn itself out.

Early on the morning of the 19th, the wave of fire struck Nagoya again, engulfing areas and plants previously damaged but not destroyed. The Japanese radio confidently had predieted the time of night the next mission would strike. but the B-29s struek later than usual, onee again confusing the Jap defenses. Over two-hundred B-29s dropped 1,858 tons of ineendiaries. Total damage to Nagoya was now five square miles. The Tokyo Cotton Mills, Yamada Engineering Works and many light industries were added to the list of industrial casualties.

In a series of five missions, the B-29s of the 21st Bomber Command had destroyed 887,855,000 square feet, or 31.81 square miles of Japan's four most important cities.

What made it possible?

First, daring and intelligent planning based on a thorough knowledge of the B-29 as an offensive weapon, and a complete study of the defects inherent in the Japanese industrial machine. Second, well trained combat crews with the courage and stamina to maintain the momentum of maximum effort. Third, the extraordinary achievement of the maintenance personnel.

With regard to the combat crews, collectively they flew a total of 4,225,000 miles, each aireraft averaging 60.5 combat hours. Eaeh crew averaged 45.5 combat hours. Coneurrently, some 30 weather and reconnaissance missions were flown. In lowering the altitude from 25,000 to 4,900 to 5,900 feet, the B-29s were subjeeted to greater danger from fighters and ack-ack.

The aehievement of maintenanee personnel was equally impressive. Ground personnel were faced with a lack of equipment, tools, warehouse faeilities, shortages of critieal equipment and engine parts. They worked 24 hours a day under the most diffieult field conditions of tropieal heat and rain, repairing battle damage, ehanging engines, making inspeetions, refueling and reloading by feel and by flashlight so that returning aireraft would be ready for the next mission. By their ingenuity and their ability to improvise, they made it possible for over 80 pereent of the total striking power to be airborne, and for over 90 percent of these to bomb effeetively the targets.

Not one aircraft was grounded for laek of parts.

Only 1.3 pereent of total airborne aireraft was lost.

It seems fitting to quote a Japanese broadeast made during the period of the ineendiary attaeks. Said the eommentator, "The 21st Bomber Command is commanded by Lemay. He has experienee in Germany. How were the bombings earried out in Germany? With about a hundred planes he raided German cities, followed by bombing German facilities." Then the commentator beeame slightly eontemptuous. "The enemy changes his tactics very often. They take turns in bombing, shuttle about or have fighter plane escort. Tokyo to Saipan distanee is far greater than London to Germany. Germany is carrying on with produetion of aireraft." Finally he reaehed the $64 question. "You are not seared of these bombings, are you?"

It should not be a diffieult question to answer. ☆

Emergency Landing in France—Page 39

News and Views around the World

CROSS COUNTRY

Tropical Disease

As the war leaps closer to the Asiatic mainland and the most densely populated lands in the world, the lessons we have learned in the prevention and control of disease will become potent weapons.

In areas where the population density is less than 10 persons per square mile, simple anti-malaria procedures have been to pitch camp at least a mile from any native village; or to remove all native workers from military posts between sundown and sunrise when mosquitoes are most pestiferous, or even, if necessary, to evacuate and burn a tick-and-mosquito-infested village.

But these simple methods cannot be applied in more densely and more permanently populated countries such as China, where the average is 250 persons per square mile. However, there are other methods of keeping our men healthy and effective.

We now have both the knowledge and the techniques to keep military epidemic diseases at a minimum. The crucial link in the chain of prevention is personal and unit discipline. The medical officer has the information, preventive procedures are well standardized, and the materials—atabrine, screening, disinfectant and, especially, DDT

Dusting out dengue

Mission against mosquitoes

—are on issue. Training and supervision are among the responsibilities of every unit commander.

We must insure that disability by disease remains a military factor on our side. Our superior sanitation discipline will be put to a severe test when we move into the more densely populated areas, where most of the inhabitants use human excrement for fertilizer. They just can't imagine how flies, mosquitoes and primitive sanitary habits can have any effect on living to a reasonably old age.

Where the routine measures are rigidly enforced, the men stay well. Screening, spraying, draining, atabrine treatment, preparation of clothing, purification of water and food doubtlessly are effective measures. The essential factor is the interest and energy of the unit commander, reflected in the alertness of his troops. The primary responsibility for the prevention of infectious diseases is fixed upon commanding officers of all grades (AR 40-210, 15 September 1942). The function of the medical department is advisory. Success is possible only by close cooperation: the medical officer supplies advice, the CO enforces discipline.

Two recent major developments emphasize the possibilities of epidemic control. DDT insecticide has provided the Allied forces with a most potent weapon in tropical warfare. DDT stopped dengue on Saipan in short order. A new method of use is the spraying of DDT from airplanes. Spraying from the air will kill off most mosquitoes and flies, prevent malaria and dengue for from two to four weeks and aid greatly in keeping down dysentery and diarrhea. Periodic respraying with DDT is necessary until new airfields are worked over more permanently by malaria control units.

The second new weapon is a GI repellent insecticide—dimethylphthalate, which is the only effective agent against mites. Mite-borne typhus, or tsutsugamushi fever, is a new disease to most of us. It is a killer. Air engineers working in grassy or forest areas are most liable to infection. Whenever such terrain is being cleared for a new field, or when an enemy field is taken over, a command function is to see that all troops wear clothing impregnated with the insecticide until the area is declared safe.

Preventive medicine must be integrated as a part of strategy and tactics, varying with the situation. Even an air task force, quick-moving as it is, can secure almost 100 percent protection. With an adequate supply system, a squadron or air force which shows a high incidence of infectious disease is suffering not from bad luck, but from ineffective cooperation between medical officer and commander.

Mosquito "Bombers"

At the height of the fighting on Iwo Jima, three AAF transport planes took off from a 7th Air Force base in the Marianas to attack the mosquitoes on Iwo. The mission was flown by C-47s at a time when the Marines had occupied half of Iwo Jima's eight square miles. With thousands of Marine and Air Force personnel already on the island and more scheduled to arrive, the job of cleaning out dangerous insects could not be delayed until the Jap fighting was over. The planes often flew as low as 50 feet above enemy lines to spray the infested island.

The Shooting 13th

"Probably more than any other Air Force, the 13th has fought a gunner's war," says Brig. Gen. William A. Matheny, former commander of the 13th Bomcom and now Deputy for Flexible Gunnery on the staff of Lt. Gen. Barton K. Yount, commanding general of the AAF Training Command.

"During the period of the bombing at-

tacks against Truk, Yap and Palau, our crews made daily appointments with the Japs, without any possibility of fighter cover. For almost a year our crews knew they would be intercepted on every mission. The missions were so long it was necessary to schedule take-offs and landings at about the same hours every time, and as a consequence there was little possibility of varying the time of assault. The Japs knew about what time our planes were coming, and were ready.

"We had no problem of maintaining gunnery proficiency," continued General Matheny. "Our gunners didn't get out of practice, for they had plenty of real targets to shoot at on their combat missions."

Present gunnery training contrasts sharply with the hurried preparations of 1942, the General said. "Facilities were so limited that we took men with 20/20 vision and after a visit to the skeet range they were aerial gunners. We robbed turrets out of planes to show our gunners what a turret was like."

General Matheny took command of the 13th Bomber Command in 1943, and led it through the Solomons and Bougainville campaigns.

"The campaigns during that period were a series of moves from one coconut grove to another, and it was a lot of satisfaction to watch the bomb groups operate," the General said. "Those outfits got so much practice they could move at an hour's notice, just like a circus troupe."

FEAF Patch

A shoulder-sleeve insigne, emblematic of the operational sphere of the Far East Air Forces, has been authorized for wear by all FEAF personnel not assigned to the 5th or 13th Air Forces.

With a background of ultramarine blue, the diamond-shaped patch has in its center the traditional star and wings of the Army Air Forces. Below the wings are five stars which symbolize the Southern Cross. The upper symbol of the design is the golden-orange sun with 24 rays in eight groups of three as displayed on the flag of the Philippine Commonwealth.

Friendly Flak

One of the grave problems inherent in the use of heavy bombers for close-up operations—the establishment of a secure bomb-line to protect friendly troops below—was solved in a novel way during the heavy smash at German positions around

QUESTIONS
on Policy and Procedure

Q. May returnees from overseas retain A-2 flying jackets and B-4 clothing bags?
A. *It is the policy of Hq. AAF not to withdraw noncritical items from personnel who have been using this equipment overseas. However, only personnel as authorized by AAF Regulations may retain critical items, such as the B-4 clothing bag. Accordingly, the clothing bag will be allowed to remain in the possession of only authorized (flying) personnel in accordance with AAF Reg. 65-23. The type A-2 flying jacket, although not listed in appropriate Technical Orders as an item of issue, will nevertheless be allowed to remain in possession of individuals. (AAF Ltr 65-68, 21 March 1945)*

Q. May the shoulder sleeve insignia of an overseas unit be worn by a returnee after permanent reassignment in the U. S.
A. *Yes, but only on the right shoulder. The insignia of the new organization will be worn on the left shoulder. The shoulder sleeve insignia of the overseas unit may be worn (but not required) in the same relative position on the right shoulder sleeve. Individuals may select the particular unit shoulder sleeve insignia they desire to wear from those authorized for the organizations to which they were assigned while serving overseas. Under no circumstances will more than one such insignia be worn on the right shoulder sleeve at a time. (C3, AR 600-40, 18 April 45)*

Q. May a prisoner of war demand that he be permitted to correspond with his family? What War Department publications outline rights of a prisoner of war?
A. *As soon as possible, every prisoner must be enabled to correspond with his family himself, under the conditions provided in Article 36 of the Geneva (Prisoners of War) Convention. For information on the rights of prisoners of war, see WD TM 27-251 and WD FM 27-10; also AAF Manual 39-1. All personnel in combat areas or about to go to combat areas should be thoroughly familiar with their rights.*

Q. Is the member of a combat crew wounded in action when flying under competent orders entitled to draw flying pay while hospitalized for the wound?
A. *Yes. Military personnel in flying status who are wounded by enemy action while in actual flight should be considered as having been "incapacitated for flying by reason of an aviation accident" within the meaning of par 10 and par 11, Executive Order 9195, 7 July 1942. This is in accord with the view of the Comptroller General. See 23 Comp Gen 267, 9 October 1943.*

Q. May recreation items, such as phonograph records too large to meet regular postal requirements, be sent overseas?
A. *Yes, but not to individuals. Parcel post, weighing up to 70 pounds in weight and measuring 100 inches in length and girth, may be sent to military agencies overseas. A package of phonograph records for instance, should be sent to Personnel Services of an activity, the Red Cross, etc. The parcel should be endorsed "For Military Agency." (Par 9 Cir 376, WD, 1944)*

Q. Will WD MD Form 81, now in the hands of troops, be automatically withdrawn and replaced by the revised form, Immunization Register and Other Medical Data, WD AGO Form 8-117?
A. *No. Form 8-117 will be used as soon as available for recording all immunization of personnel upon entry into the service, and will be initialed for all personnel when occasion calls for additional recording of immunization, dental, spectacle, or sensitivity reaction data. (Sec IV, Cir 32, WD, 1945)*

Q. May an officer consider the terms "accountable" and "responsible" synonymous?
A. *No. An officer may have both accountability and responsibility for property, or he may have accountability alone or responsibility alone. For example, an officer who carries property on a stock record account and who has such property in his own custody, either in use or in storage, has both accountability and responsibility. An officer who carries property on a stock record account may issue it on memorandum receipt. In such case, he does not drop the property from his stock record account and he maintains accountability, but does not have responsibility as the property has been entrusted to another who is to be charged with its care and safekeeping. The officer who has given the memorandum receipt has responsibility, but does not have accountability, as he is not required to maintain a stock record account for the property. (AR 35-6520)*

PREPARED BY THE OFFICE OF THE AIR INSPECTOR

Eschweiler a few months ago. Mindful of the damage that had been caused at St. Lo by the malfunctioning of some bomb-bay doors and the mistaken identification of the target area by a few aircraft, steps were taken to deal with both hazards.

In the first instance, bomb-bay doors were opened over the Channel, then locked until the aircraft had passed a safe distance into the target zone.

Identification of the target zone was established by several interlocking methods—colored panels on the ground, barrage balloons, and a radio fan marker—but by all accounts the most successful aid was a line of demarcation beyond which it would be safe to bomb set up by bursts from friendly flak batteries. These were positioned on a 3,500-yard front, providing for bursts 500 yards apart 2,000 feet below the bombers, eight bursts simultaneously every 15 seconds. Extensive effort was made to insure continuity of communication among the batteries, and there were no communication failures during the entire operation. Nearly 500 salvos were fired during the bombing period, and it is officially recorded that not a single bomb fell on friendly troops.

Pilots and bombardiers reported favorably on the technique employed, although observing that the red bursts which they had been briefed to expect appeared as black save when they were directly above them. The wisdom in the use of alternative methods of identifying the target area was demonstrated by the fact that overcast prevented sighting of the colored panels on the ground, and a number of the barrage balloons were punctured by flying metal and collapsed, but the line of friendly flak bursts was clearly distinguishable by its positioning, spacing and timing.

Bombed Bomber

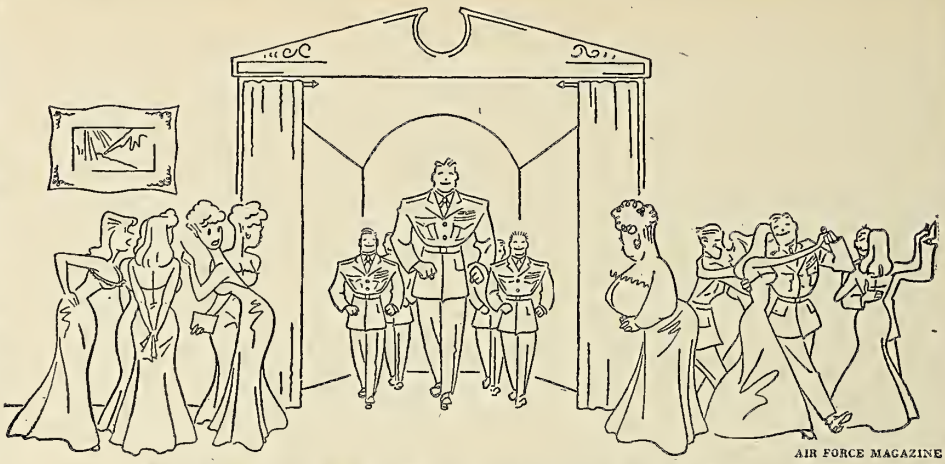
On a night mission over the Jap Bonin Islands, four Liberators sneaked in between the hills to bomb shipping installations. Just as the bomb bay doors were opened, an accurate volley of antiaircraft fire burst in the tight formation.

Cpl. Vincent F. Sutter, waist gunner, saw the frame of another Liberator loom up beside him. He braced himself as the wingtip of his plane crashed into the nose of the other bomber. He watched the other plane rise, and at that moment a 2,000-pound delayed action bomb rolled out of the neighboring plane and crashed into his bomber, lodging in the waist, two feet from where the corporal was standing.

On the flight deck the pilot, Lt. Robert L. Strong, felt his controls lock as the cables running through the waist were pinned against the fuselage. Aided by the copilot, Lt. Thomas B. Engram, he was able to pull the B-24 out of a dive when there remained less than 100 feet between them and the harbor waters.

Unless they could jettison the bomb quickly, the crew realized that its weight and the vibration of the torn fuselage would saw the control cables apart. Cpl. Milas Kennington, flight engineer, hurried down from his top turret and surveyed the situation. He then stripped down the two waist guns and, using their barrels as crowbars, he and the men were able to pry the bomb loose and dump it out.

All that remained then was a six-hour flight over the Pacific in a B-24 so torn and weakened in the middle section that it defied nearly all the rules of aeronautical structure. But they made it back to base.



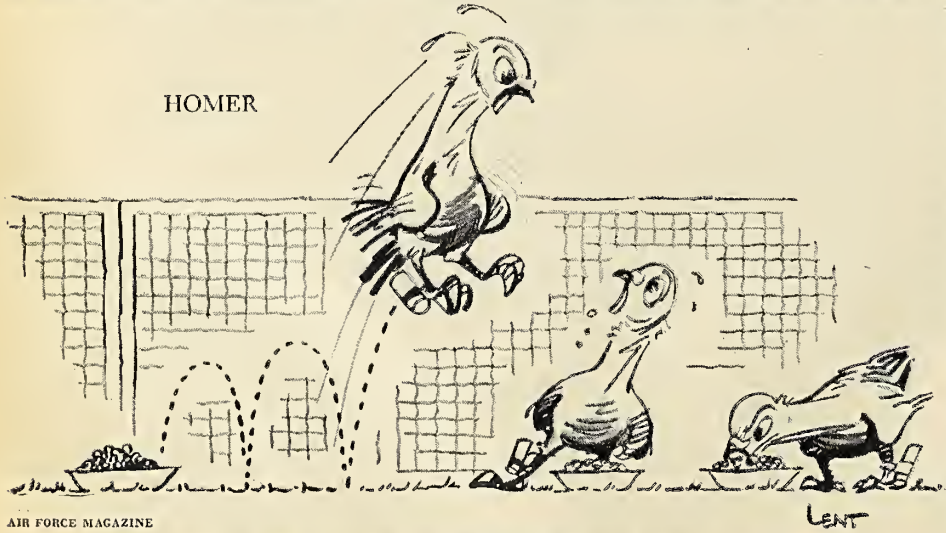
"I'll handle the B-29, you girls take care of the fighter escort."

AAF Scientific Advisory Group

A number of scientists are serving as a Scientific Advisory Group to the Commanding General, Army Air Forces, with regard to planning for future development and research for the AAF. Most of the personnel in the group have been engaged in war-work since the beginning of the war, some even earlier.

The group is under the direction of Dr. Theodore von Karman, who before undertaking this assignment was Director of the Guggenheim Aeronautical Laboratory at the California Institute of Technology, and was engaged in research on rockets and jet propulsion. He is an outstanding leader in research on aerodynamics and aircraft structure.

The other civilian members of the group are: Dr. L. A. DuBridge, Director of the Radiation Laboratory of the Massachusetts Institute of Technology, who has done outstanding work in electronics and radar fields; Dr. Vladimir K. Zworykin, Assistant Director of RCA Research Laboratory, who developed the iconoscope, electron microscope and numerous television devices; Dr. Hugh L. Dryden, Chief-Mechanics and Sound Division, National Bureau of Standards, who has been engaged in the development of special missiles for the National Defense Research Committee; Mr. George S. Schairer, Chief Aerodynamicist of the Boeing Aircraft Company, who was responsible for the aerodynamic design of the B-29; Dr. H. S. Tsien, California Institute of Technology, an expert on rockets and their applications; Dr. W. J. Sweeney, Associate Director of Esso Laboratories, Standard Oil Development Company, who has made important contributions to the development of new aircraft fuels; Dr. F. W. Wattendorf, Civilian Director of the 20-Foot Wind Tunnel Branch, ATSC, Wright Field, Dayton, Ohio, who has studied the aerodynamics of modern aircraft power plants; Dr. D. P.



"Which one of you birds put the Mexican jumping beans in my feed?"

McDougall, Deputy Research Director of Explosives Research Laboratories; Dr. N. M. Newmark, former Professor of Civil Engineering, University of Illinois, previously engaged in studying the effects of explosives in producing damage; Dr. George A. Morton, Electronic Research Laboratory, RCA; Dr. E. M. Purcell, Radiation Laboratory, Massachusetts Institute of Technology; Dr. A. J. Stosick, California Institute of Technology. Mr. Morton Alperin, ATSC, Wright Field, Dayton, Ohio, serves as Technical Assistant.

Emergency Landing Fields

The U. S. 8th Air Force Service Command's system of emergency landing fields and strips located throughout northern Europe has saved more than 600 warplanes.

The cover picture of Cross Country this month shows Lt. David Stewart of Dallas, Texas, shortly after he made an emergency landing on an airstrip near a French town. The photograph, taken by Corporal Kammerman of the 8th AAF, tells a little story of French-American unity as the P-51 pilot shows the American flag he is wearing for identification to a little French girl. Lt. Stewart was forced down while returning from an escort mission over Germany.

French-American smiles

The Service Command's emergency landing fields and mobile units have reclaimed planes which might otherwise have been lost to the air assault on the enemy.

Swing Low

After the first low-level bombing attacks on German robomb sites last year, P-47 pilot reports from the 365th Fighter Group did not give altitude, but they did contain such revealing references as: "Coming out of the dive, I leveled out almost above the trees" . . . "Ahead of me were some wires, like the high tension lines in the States; I tried to duck under them. The propeller cut several and wound up a few yards on the hub" . . . "To jump the trees in the

PLANE BONERS

Analyzed by Veteran Pilots

ATLANTA, GA.—Pilot in P-61 overshot landing, first touching 2,000 feet down runway. Instead of going around the pilot applied brakes and attempted to stop before reaching end of runway. It didn't work and airplane nosed-up in soft dirt.

Comment: It seldom works. If at first you overshoot, go around.

LONG BEACH, CALIF.—On B-24 take-off pilot braked wheels preparatory to raising gear. Left wheel had not cleared runway and tire blew out. On landing the pilot held left wing up as long as possible but when tire settled to runway the plane veered into soft dirt, and nose gear collapsed.

Comment: Best braking time is after plane leaves ground, not before. If you are caught with a flat tire in a B-24 successful landing is possible with little or no damage. Procedure recommended in a B-24 Pilot's Training Manual is:

1. *Notify tower that full stop landing on runway is necessary.*
2. *Get permission to use runway with wind quartering from good tire side if possible. But avoid drift or you'll blow the other tire, too.*
3. *Cut sink to minimum by controlling it with power.*
4. *Get nose down upon contact and hold forward pressure upon nosewheel. Directional stability of tricycle gear will help hold airplane straight.*
5. *Use power on flat tire side with light braking on good tire side to maintain a straight path.*
6. *Keep airplane where it stops until tire is changed.*

VICHY, MO.—On C-46 night take-off the crew felt a jolt and the left engine quit. Pilot immediately called for emergency landing, and while coming in the right engine sputtered and stopped. Wheels in down position were retracted and a belly landing made.

Comment: On takeoff this C-46 struck an inadequately marked trailer parked seven feet at right of runway. Jolt jarred fuel lines loose, causing engines to miss and stop. The plane's pilot did some quick thinking, nosed down for landing and retracted wheels for belly landing when last engine gave out. If control tower had been on the ball, pilot would have been warned of danger offered by parked trailer. But they hadn't bothered to check as to whether runways were really open when they so declared them.

KISSIMMEE, FLA.—A P-47's tire blew out on landing, but the pilot kept the plane under control and was nearly stopped when tower told him to clear runway if he could. He couldn't. Flat tire came off as plane moved off runway, throwing the P-47 on its nose.

Comment: Don't, except in an emergency, move a plane by its own power when it has a flat tire no matter what anybody says.

LAKE CHARLES, LA.—An F-7B on a photo mission landed after a routine cross country flight. Leading edge of the horizontal stabilizer was found to be damaged by the 5-man life raft which was blown out of its cradle in flight.

Comment: Either the life raft in this plane became partially inflated and blew out the door or the door was improperly installed, allowing the raft to blow out. Check your raft before take-off and see that it and all allied equipment are properly installed.

POPE FIELD, N. C.—Crew chief of a C-47A was sucked out of the plane while attempting to replace the para-door. Not wearing a parachute, he fell 13,000 feet to his death.

Comment: It's tragic that working with paratroopers didn't convince this man of the importance of parachutes. Have your parachute with you. Wear it at all times when you are in danger of falling out.

MADISON, WIS.—At 140 mph, 1,500 feet from start of takeoff run, a P-63C pilot retracted his landing gear. The P-63's nose was lowered and its prop chipped up chunks of runway because the plane was not airborne.

Comment: Some pilots never learn.

GREENWOOD, MISS.—A P-51D pilot used full flaps to land in a gusty wind. The right wing started down and the pilot applied full left rudder but the plane ground-looped.

Comment: Best P-51 procedure for gusty wind landings is to come in slightly faster than usual, using half, not full, flaps. The ballooning effect of a gust is apt to drop the plane out from under you, sticking a wing in the ground. Keep sufficient speed to cushion this drop.

NOTE: In the May issue, two items in PLANE BONERS were concerned with instances in which emergency landings in rough fields were made wheels down. The comment neglected to point out that accepted procedure for emergency landings in rough fields is wheels up.

PREPARED BY THE OFFICE OF FLYING SAFETY

NEW BOOKS

WAR

HI-SKY, THE UPS AND DOWNS OF A PINFEATHER PILOT. *Alec McAlister.* A young airman's experiences in the British Commonwealth Air Training Plan. RYERSON PRESS, TORONTO, 1944.

HISTORICAL

THE WORLD AT WAR, 1939-1944. *U. S. War Dept. Military Intelligence Division.* Brief history of the origins and operations of World War II. INFANTRY JOURNAL, WASHINGTON, 1945.

POST-WAR

PSYCHOLOGY FOR THE RETURNING SERVICEMAN. *National Research Council.* Psychological facts about the thoughts and feelings of servicemen. INFANTRY JOURNAL, WASHINGTON, 1945.

TECHNICAL

AIR NAVIGATION, PART SEVEN: CONTACT FLYING. *U. S. Bureau of Aeronauties (Navy Dept.).* Publication of this volume completes the Navy's Flight Preparation Training Series. MC GRAW-HILL, N. Y., 1945.

AVIATION RADIO. *H. W. Roberts.* Radio facilities and navigation, and the design and installation of radio apparatus. MORROW, N. Y., 1945.

INTRODUCTION TO MICROWAVES. *Simon Ramo.* The physical basis for all microwave phenonena. MC GRAW-HILL, N. Y., 1945.

PHOTOGRAPHIC SURVEYING. *B. B. Talley and P. H. Robbins.* Theory and application of photogrammetry. PITMAN, N. Y., 1945.

PHYSICS OF FLIGHT. *Alfred Lande.* Basic principles involved in the flight of airplanes. REINHOLD, N. Y., 1945.

THEORY OF FLIGHT. *Richard Von Mises.* Fundamental ideas underlying the design and operation of modern aircraft. MC GRAW-HILL, N. Y., 1945.

YEARBOOKS AND HANDBOOKS

AIR NEWS YEARBOOK. *Phillip Andrews.* The second issue of this yearbook of photographs and air information. DUELL, SLOAN & PEARCE, N. Y., 1945.

AIRMAN'S ALMANAC. *Francis Walton, Ed.* The new 'World Almanac' for international aviation. FARRAR & RINEHART, N. Y., 1945.

JANE'S ALL THE WORLD'S AIRCRAFT, 1943-44 and JANE'S FIGHTING SHIPS 1943-44. The long-awaited new editions of two standard handbooks. MAC MILLAN, N. Y., 1945.

These books are available to AAF personnel through the AAF Field Technical Library Service, which provides for technical libraries at all major installations. List compiled by AAF Headquarters Library.

road between me and the target wouldn't have given me time to get back down to drop my load, so I let my wing cut through it" . . . "When I released my bombs I had to pull up sharply to clear the two-story building." That is what they mean by "on the deck" fighter attacks.

Battle Honors

More than a dozen AAF units have been added to the list of those authorized by Headquarters to wear the Distinguished Unit Citation, since the last previous listing in the May issue of AIR FORCE. Following are the units, the date of action and a brief resume of the citation as published in General Orders of the War Department. In response to several suggestions, the numbers of the GOs are given in parentheses, following each citation.

33rd Fighter Group Jan. 15, '43

Scored a decisive victory over German Air Force planes in Tunisia when its forward bases were under attack, thus preserving them for use against Axis preparations for an offensive in Central Tunisia. Despite extreme difficulties in obtaining equipment, supplies and personnel replacements and the hardships of primitive living conditions, the P-40s of this group were kept airborne by ground crews. (GO 25, '45)

27th Fighter Group Sept. 10, '43

Contributed in great measure to the successful establishment of the Salerno beachhead by flying 12 missions on this date to create and exploit roadblocks which resulted in neutralizing the combat effectiveness of 3 Panzer divisions. In the first 5 missions, the A-36s of this group piled up a huge column of German armor and transport at a junction 70 miles from the beachhead, and in the succeeding 7 missions, low-flying strafing planes destroyed a total of 177 vehicles while damaging 246 more vehicles and guns. (GO 21, '45)

Dec. 1, '43—May 20, '44

1st Air Commando Group

Carried assault troops and engineers behind enemy lines in Burma to initiate the invasion of Myitkyina, after intensive preparatory efforts over a period of months. The security nature of the undertaking ruled out the use of native labor, and officers loaded bombs and refueled planes, while enlisted men unloaded box cars. The liaison section of the group evacuated as many as 700 sick and wounded in less than 3 weeks, and the assault force on one mission (March 8) destroyed 20 percent of the known Jap aircraft in Burma. (GO 26, '45)

Feb. 15—Mar. 20, '44

67th Reconnaissance Group (Tactical)

Provided indispensable low altitude oblique photos of the Channel Coast from Le Havre to the Straits of Dover prior to the Normandy invasion, in a total of 83 missions flown from the vulnerable altitude of 3,500 feet. To accomplish their objective, the pilots had to forego evasive action, and fly straight, level, undeviating courses in the face of heavy concentrations of enemy ground fire. (GO 25, '45)

450th Bombardment Group (H) Feb. 25, '44

Rendered an invaluable contribution to the Allied war effort by destroying the Prufening Aircraft Factory in Regensburg, whose capacity was 250 ME109s monthly. The B-24s of this group led an entire wing formation to the target, despite flak and enemy fighters that cost them 4 bombers. (GO 3, '45)

Mar. 11—May 19, '44

459th Fighter Squadron

Though forced to seek out and attack the enemy over his own airdromes in the IB Theater, this squadron destroyed 119 Japanese aircraft in 70 days, with a loss of only 7 of their own. This average of nearly 2 planes per day was maintained in spite of shortages in aircraft and spares which kept the squadron at half its operational strength. (GO 26, '45)

May 17—June 16, '44

1st Troop Carrier Squadron

Carried American infantry, airborne combat and construction engineers, Chinese artillery and infantry and other troops in unarmed, often overloaded, cargo-type planes from points in Assam, India, to the assault of Myitkyina, Burma. Also, nearly 2,000,000 pounds of supplies were flown to this area, as well as nearly 3,000,000 pounds to ground units fighting in other points in Northern Burma. (GO 26, '45)

June 6—11, '44

326th Airborne Engineer Battalion

Were instrumental in achieving decisive results in the early critical days of the Normandy invasion. Because of widely scattered drops, the first echelon attached itself to parachute elements nearby, and fought as infantry for 36 hours in order to reach its designated assembly points. Among their accomplishments was the construction of a bridge across the Douve River which made possible the successful assault on Carentan by parachute infantry. (GO 30, '45)

Aug. 17—21, '44

1st Emergency Rescue Squadron

Performed seemingly impossible landings and rescues in heavy seas, under adverse weather conditions and frequently in the face of fire from enemy shore batteries. Equipped with only 9 operational aircraft, they conducted exhaustive searches over the Ligurian, Tyhrrhenian, Northern Mediterranean and Adriatic Seas. (GO 6, '45)

321st Bombardment Group (M) Aug. 18, '44

Executed a mission unprecedented in a single medium bombardment attack by sinking the battleship Strasbourg, the cruiser La Galissonniere and a submarine in Toulon Harbor, when their heavy guns posed a serious threat to Allied operations 3 days after the invasion of Southern France. The 36-plane formation negotiated the flight from Corsica bases by dead-reckoning, owing to hazardous weather conditions, and bombed from 13,000 feet despite intense fire in the heavily defended area which damaged 27 of the planes and wounded 12 personnel. (GO 25, '45)

36th Fighter Group Sept. 1, '44

Struck a decisive blow at enemy transpor-

tation and personnel at an important juncture in the campaign of Northern France by destroying more than 500 vehicles in the Poitiers, Chatellerault, Clamecy, Bourges, Chateauroux area in 4 missions from dawn to dusk. The group was divided into 2 units, effectively patrolling all roads by which the enemy could escape from the area.

368th Fighter Group Sept. 3, '44

Aided the advance of ground troops in the vicinity of Mons, France, by carrying out 7 missions in which 262 enemy motor transport, 230 horse-drawn vehicles and various targets of opportunity were destroyed. The 83 P-47s made their attacks in the face of withering barrages of antiaircraft and small arms fire. (GO 25, '45)

404th Fighter Group Sept. 10, '44

Flew 3 armed reconnaissance, air-ground cooperation missions in the vicinity of Duren, Koblenz and Aachen in the course of which it destroyed 24 locomotives and more than 100 freight cars, rendered 2 bridges unusable and cut 32 railroad lines. This decisive blow to enemy transportation was delivered at low altitude despite extremely unfavorable flying conditions. (GO 25, '45)

405th Fighter Group Sept. 24, '44

Provided cooperation with ground forces at a critical juncture of an enemy counterattack during the battle of France. Early in the day, two squadrons took off with a 1,500-foot ceiling, found their target by ground control and destroyed a number of enemy tanks from 800 feet. Another squadron was sent later to attack the same enemy formation, but, when it could not be located, attacked instead a reinforcing convoy of 100 armored vehicles and trucks. The remaining squadron was assigned to attack an enemy fort which had been offering stubborn resistance, and scored direct bomb hits on it. (GO 25, '45)

Oct. 15, '44

492nd Fighter Squadron (48th Fighter Group)

Frustrated an enemy counterattack against ground forces by interrupting its homeward flight, and strafing the armored spearhead of the attacking formation. Despite critical fuel shortage, the squadron carried out two minimum altitude runs with such accuracy that the enemy thrust was completely thwarted. (GO 25, '45)

365th Fighter Group Oct. 21, '44

Executed a highly successful fighter sweep in which 21 enemy planes were destroyed, one probably destroyed and 11 damaged. Sighting a formation of 30 FW109s approaching head-on, the squadron flying top cover feinted a diving attack, forcing the enemy planes to fly directly between the 2 following squadrons which struck viciously. On the homeward journey, top cover reported another enemy formation approaching and maneuvered them into a situation in which the same devastating process could be repeated. (GO 25, '45)

Dec. 24, '44—Jan. 2, '45

358th Fighter Group

Was principally responsible for the maintenance of aerial superiority against a resurgent GAF during the period of the Ardennes breakthrough against the 7th Army. The climax of its effort of 79 missions flown in 9 days came on January 2, in the Saarguemines area, when 12 of the group's P-47s engaged in an armed reconnaissance encountered a large formation of FWs and MEs. Disregarding the enemy's numerical superiority, they jettisoned their bombs, closed for the attack and destroyed 14 without loss to themselves. (GO 27, '45)

357th Fighter Group Jan. 14, '45

Inflicted a humiliating defeat on a numerous and determined enemy formation while escorting heavy bombers on an attack on Derben, Germany. Nearing the target area, a force of 60 to 70 FW190s covered by nearly 100 ME109s, sought to break through to the bombers, but by superior tactics and fighting spirit, the pilots of this group triumphed in an aerial battle lasting 30 minutes in which 56 enemy aircraft were destroyed, against a loss of only 3 of their own planes. (GO 27, '45)

School in Italy

The little "belly tank" school house in southern Italy has been opened for business. There isn't any flinging of erasers, dipping of braids into inkwells, no car-

"Belly tank" school house

toons on the blackboard, labeled 'teacher'; or any of the other high-jinks usually associated with school days; because this schoolhouse is run by GIs of the 52nd Fighter Group of the 15th Air Force.

"Teacher" is generally one of the men of the group, who has had some civilian experience that qualifies him for the "position." The instructor in the photograph is T/Sgt. Anthony Pioli, who because of his excellent knowledge of the language, teaches an Italian class with the aid of language records supplied by Special Services.

As soon as the last Mustang has been sweated in from the mission of the day, as soon as it has been serviced and prepared for another day of combat, school is in, and the men who have flown the planes or serviced them come flocking in for their lessons in the three R's and other related and advanced subjects.

The idea for the school first began to percolate in the brains of Capt. Felix Gervais, group special service officer, and his assistant, Sgt. Clarence E. Johnson. The men of the group had shown a tremendous interest when the AFI courses had been introduced, with more than 30 percent signing up for a variety of subjects. Special texts and reference books were ordered from the States to help these part-time students in their studies.

Many of the men who were taking the AFI courses felt that they were not getting enough out of them because of the lack of planning in their isolated self-study. It was at this point that Captain Gervais and Sergeant Johnson took a "reading." They found that there were many officers and enlisted men who were well equipped to teach school. They interviewed these men and were assured by them that they would be glad to help start a real school in the field, teaching at night in their spare time.

A school board was organized to plan the courses, the hours of study and select the subjects to be offered. They outlined courses in philosophy, history, economics, mathematics, engineering, physics and other academic and commercial subjects which would help the men prepare for further education, or fit them for postwar jobs.

TRAINING AIDS

Newly Standardized for Field Use

FILMS

TF 1-3456, Passenger Briefing—Dramatized review of ditching procedure slanted to passengers of the Air Transport Command, both civilian and military. Running time: 26 minutes.

TF 1-3453, Operation of the K-13 Compensating Gun Sight—Trigger Joe, cartoon character, is again convinced of the accuracy of another of the K-series sights. Running time: 14 minutes.

TF 1-3738, The Electrically Heated Flying Suit—Shows how suit is made, how it is put on, used, taken off and cared for, and shows effects of high-altitude frostbite on the man who misuses this equipment or fails to use it at all. Running time: 21 minutes.

TF 1-3745, Replacement of Medium Pressure Hydraulic Hose Assemblies. Running time: 10 minutes.

TF 1-3436, 50-Hour Inspection of the B-29, Part V. Fuselage Interior. Running time: 55 minutes.

TF 1-3448, Driftmeters: Part I, Reading Drift. Running time: 17 minutes.

TF 1-3449, Driftmeters: Part II, Ground Speed and Bearings. Running time: 13 minutes.

PUBLICATIONS

Coming Home (AF Manual No. 59)—For AAF combat returnees who are to be discharged or reassigned to duty. For better understanding of themselves in regard to readjustment to civilian life or reassignment at continental installations. (Copies available only from Air Surgeon's Office.)

Care of Personnel in the Wet Tropics (ADT Branch of AFTAC Bulletin No. 9)—Newly revised informational bulletin stressing precautions against insects, diseases, excessive heat, contaminated water and food, skin troubles and wild animals. (Copies available from AFTAC, Orlando, Fla., Att: Chief, ADT Branch.)

A Manual for the Instructor on the Poorman Flexible Gunnery Trainer (AF Manual No. 66)—Gives the instructor facts and principles needed for performance of duties with the device.

Fighter Gunnery, Rocket Firing, Dive Bombing (AF Manual No. 64)—For fighter pilot use only. Limited number of copies available.

GRAPHICS

Bombs and Fuzes—Cross-sectional diagrams and "exploded" views of most of the bombs and fuzes used in aircraft bombardment. 35 sheets in full color.

Damage to Runways—Single poster warning pilots against pivoting planes on locked wheels. This practice has caused serious damage to asphalt pavement, tires and landing gear.

Electrically Heated Overshoe Insert—Single poster pointing out that the Shoe-Insert, Flying, Electric, Type Q-1, is always worn over the shoe and under the boot.

RECOGNITION

General Purpose Trainer, Type R-2 (Opaque Objects)—Handy projector for use in aircraft recognition training. Small, compact, and permits reproduction on a screen of pictures cut from Recognition Journal, newspapers, etc.

B-1 British Naval Vessels—Seven posters showing side views and plan drawings of several of each type of major naval vessels used by Great Britain.

New Aircraft and Ship Slide Supplements—Nos. 10, 11 and 17, U. S. aircraft; Nos. 12 and 19, German aircraft; Nos. 13 and 18, British aircraft; Nos. 14, 15 and 16, Jap aircraft. Also Ship Slide Supplement No. 2, showing British, Jap and U. S. warships and merchant vessels.

Aircraft Silhouette Posters—Lot No. 16, U. S. planes; Lot No. 17, Jap aircraft.

Aircraft Test Posters—Twenty-four in series, covering U. S., British and Jap aircraft operating in the Pacific theater.

Joint Army-Navy Sighting Guide—Four-page folder keyed to "SWPA" ship reporting system, and used in reporting Jap warships, merchant vessels and aircraft.

Allied Sighting Guide—Much like above Joint Army-Navy Guide, but used for Allied shipping.

Information on the availability of training aids listed in this column, unless otherwise indicated, may be obtained from the chief, Training Aids Division, Army Air Forces, One Park Avenue, New York 16, N. Y., upon request through channels.

When the theoretical groundwork had been supplied and agreed upon, there still remained a physical problem. There was no suitable building to house the school. Here the men themselves answered the problem.

Empty crates, in which the auxiliary gas tanks had been shipped, were carefully hoarded until a large supply was accumulated. The crates, stripped and cleaned, made pre-fabricated wall sections for the building. The interior walls were braised with acetylene torches so that the grain of the plywood came through sharp and clear, making a warm decorative effect without the use of paints or trims. Benches were made from scrap lumber. Blackboards were built into the walls. Bomb cluster boxes stacked on top of each other with their covers removed made bookcases for the library. A map and current events room was added, and school began.

Command Changes

Recent command changes include:

Lt. Gen. Barney M. Giles, from deputy commander, AAF, to commander, AAF forces in the Pacific Ocean Areas.

Lt. Gen. Ira C. Eaker, from commander, Mediterranean Allied Air Force, to deputy commander, AAF.

Lt. Gen. John K. Cannon, from commander, 12th Air Force, to commander, Mediterranean Allied Air Force.

Maj. Gen. Benjamin W. Chidlaw, from commander, 22nd Tactical Air Command, to commander, 12th Air Force.

Hasty Hearts

S/Sgt. Roy W. Gutzmer of Rochester, N. Y., signpainter for an Aviation Engineer Battalion in the Marianas, has offered students of social science a new insight into human behavior. In addition to more pressing duties, the sergeant contributes to morale by painting the various feminine names which drivers have on their trucks; Dotty, Mary, Lou—that sort of thing.

Sergeant Gutzmer was glad to render this service for a time, but lately he reports a wave of fickleness sweeping over his men. Sometimes he doubts that truckdrivers know their own minds.

"They used to be good steady Joes," he explained. "Now, I find they are sensitive and fickle. A guy will drive up and want Margie painted on his truck, even before Lucy is dry. Then next week he may be around to have Lucy put back on."

Sergeant Gutzmer says these caprices of heart can usually be attributed to the truckdriver's last letter, or lack of a letter.

Among the Souvenirs

Not long ago, a returnee came into the U. S. customs office at Miami Air Field carrying a nine-foot canoe which he had brought back from overseas.

The custom inspectors, long familiar with such sights, didn't bat an eye. The canoe was not contraband, and the GI was permitted to take it home.

"Someday," one of the inspectors said, "I expect to see a joker come through here

with a U-boat or the Taj Mahal."

On duty at the Miami ATC terminal, through which overseas returnees pass to have their baggage examined, the customs men have seen just about everything in the past year. One man brought 100 cigars, and occasionally a soldier will come through with $100 worth of cigarettes, the allowed limit. Silk stockings, purchased at Natal and Persia and other faraway places, rate along with perfume as the most popular gifts GIs are bringing home to wives, mothers, sisters and sweethearts.

Intrinsic value of the gifts and souvenirs range from a few cents to more than $100, but most highly prized are those on which there is only a sentimental value, a rusty Jap rifle, a tattered piece of an enemy battle flag, or a rainbow-colored pebble from some beach. It may even be a native straw hat or wooden shoes.

Crews on the Air Transport Command's famous "Fireball Express" planes, which fly out of Miami on regular Ferrying Division runs to India with high priority cargo, are experieneed souvenir hunters. Between flights they have picked up literally everything that was loose in Natal, Ascension Island, Cairo, Khartoum, Karachi, and other points along the 13,500 mile route. Nearly all of them wear leather mosquito boots, usually purchased in Natal. Most of them have acquired daggers and billfolds in India. One crew chief has an imposing collecton of wood carvings.

Perfume, jewelry, oriental curios and handbags are the most popular items brought back by GIs. Customs laws provide that $100 worth of goods may be brought in duty free—provided none of it is on the prohibited list. The maximum on liquor and wine is one gallon. Certain perfumes are prohibited, and many others are restrieted as to the amount which may be brought into the country.

Captured enemy firearms and other munitions of war are considered government property and may not be brought through customs as souvenirs of battle unless the "owner" has a certificate from his commanding officer stating that the items have been authorized as souvenirs by the theater commander. In many cases this authorization is granted with the result that many German and Jap revolvers and rifles, helmets, battle flags, and other small pieces of enemy equipment are streaming through customs and into American homes.

The Hermit

Sgt. Charles Sibray of Odon, Ind., is probably the tail-endest Tail End Charlie in the entire AAF. His Fortress was flying over Germany when a direct hit set the left wing afire. The pilot warned the crew to prepare to bail out. Sibray disconnected his interphone for a few seconds to kick open the emergency door from his rear turret, then returned to his guns. The long silence that followed worried Charlie somewhat. An hour passed, and the big plane kept flying smoothly toward France. When it reached Nazi lines and flak bursts were seen from his position, the sergeant called out their loeation. Several bursts got uncomfortably close and Sibray began to wonder why the pilot didn't take evasive action. He left his turret to investigate and found that he was alone in the Fortress. He had been alone for the past 150 miles. Sibray bailed out and eventually got back to his base.

"Look, junior is a ball turret gunner just like you!"

Where There's Hope . . .

A young hospital-trained copilot, Lt. Emmett R. Turner, Jr., of Stratford, Texas, pumped life back into the body of a gunner who had been unconscious for 90 minutes after being trapped without oxygen in the ball turret mechanism. The revived man was T/Sgt. Donald F. Houk of Appleton City, Mo. The action took place five miles above Germany.

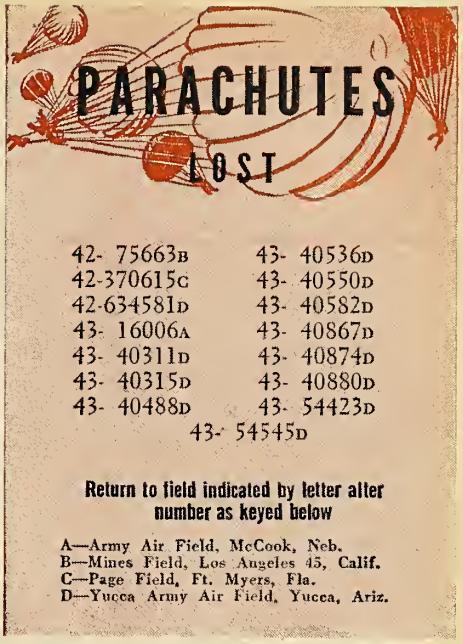
Their B-17 had just dropped its bombs when Houk, radio operator and gunner, tripped and fell into that part of the turret mechanism which extends up into the fuselage. His oxygen mask was ripped from his face.

Lieutenant Turner and other crewmen who went to work to free the sergeant estimate that about nine minutes elapsed before they could got the gunner to a position where an oxygen bottle could be held to his nose—a longer time than life can usually be sustained without oxygen at 25,000 feet.

When the lieutenant and crewmen began to apply artificial respiration, the chanees of saving Houk were slight. His face was without color and no response came from his lungs for more than 90 minutes.

"The life seemed to have gone out of him, but I knew from my hospital training that a person can often be saved when it seems hopeless," Lieutenant Turner said. "Because he was still trapped under part of the turret, I could use only one hand, while the other boys held the oxygen bottle to his face."

Finally, however, Sergeant Houk began to breathe faintly, and after 15 minutes he was breathing steadily. By the time the Fort reached its home base, he was able to leave the bomber without assistance. ☆



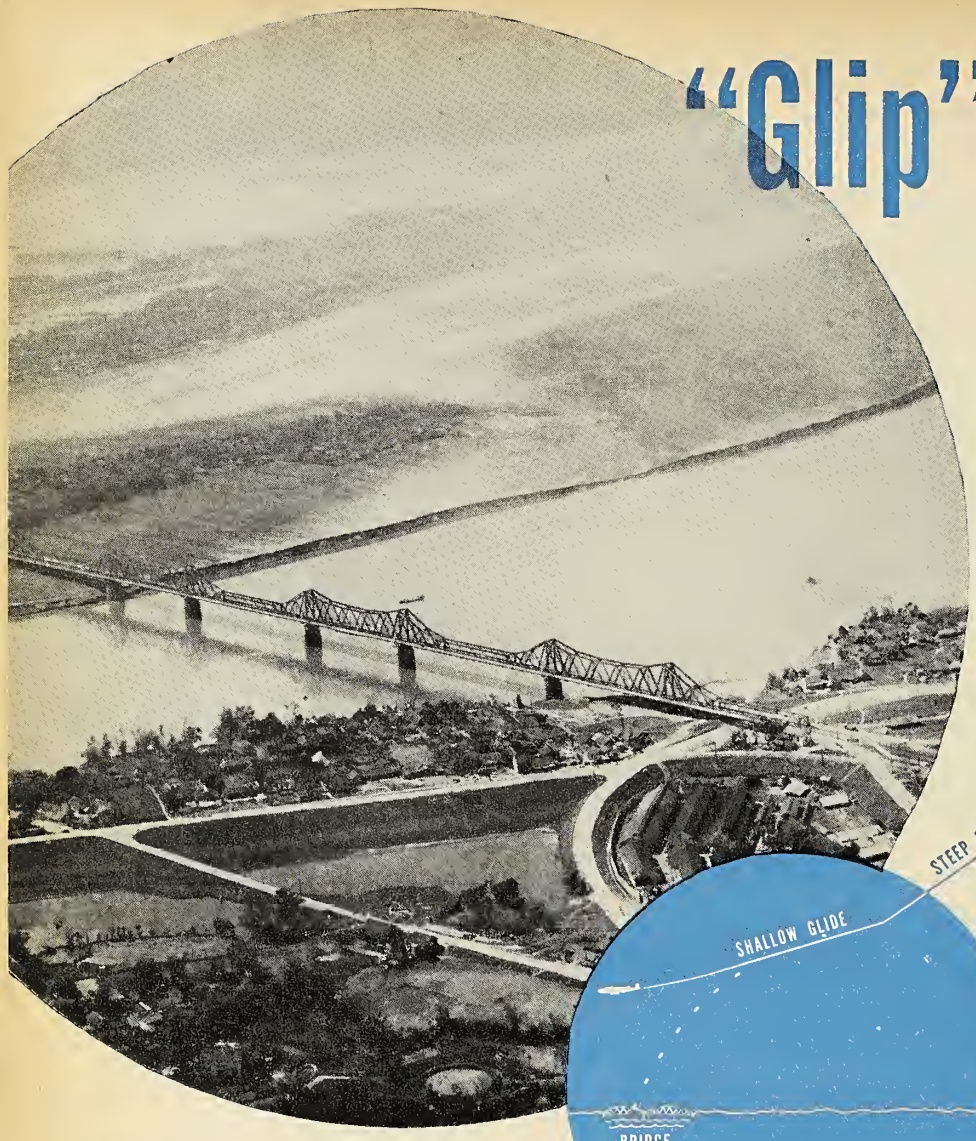
HOW SHARP ARE YOU?

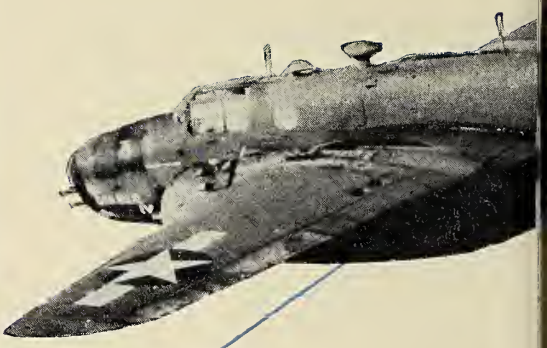
QUESTIONS

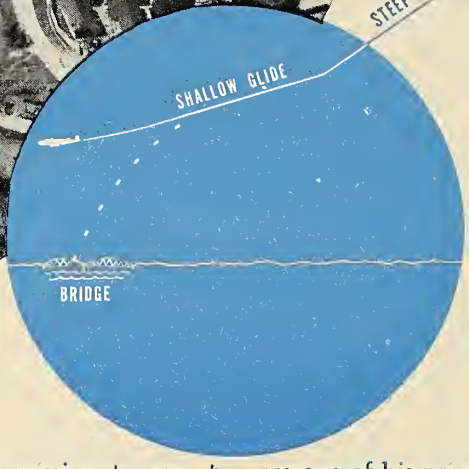
1. What plane is shown in background?
2. How many hangars can you see?
3. What is the trade name of the fork lift?
4. How many men standing on the fork lift?
5. How many red cross insignia do you count?
6. Can any planes be seen inside the hangars?
7. How many men on stretchers do you see?
8. How many ambulances have their doors open?
9. How many men, if any, standing on the plane?
10. Do the hangars have camouflage markings?

ANSWERS ON PAGE 60

"Glip" Bombing







When too many bombs were being used to destroy bridges, this 14th Air Force Group developed an economy technique

BY LT. COL. GEORGE W. TAYLOR
Chief, Operations Analysis Section
14th Air Force

When twelve B-25s returned from a mission to report that they had destroyed four bridges at an average cost of three tons of bombs per bridge, the 14th Air Force's "Falcon" bomb group knew that its "Glip" bombing technique had come to stay.

This proof of the pudding for the new bridge busting method was brought in by the "Ringer" squadron, whose targets had been strategic spans in French Indo-China. And, they pointed out, they were not just of the flimsy, wooden variety, but sturdily built, prewar bridges of steel and heavy masonry.

Improvisation in bridge busting methods is an old story in China and India. In the February issue of AIR FORCE, "Burma Bridge Busters" told how a 10th Air Force unit solved its problem of poor bombing results by developing a technique of shallow dive bombing which eliminated the "skip" from low level bombing.

The Falcon Group was hitting its bridges all right, but it was taking too many bombs. In December, 1944, their average cost was 15.5 tons of bombs per bridge destroyed . . . and that was when Glip Bombing, another variation of bridge busting, was born.

Maj. Gen. C. L. Chennault, commanding the 14th Air Force, was not satisfied with this bomb expenditure. Bridges are one of his principal targets and tonnage expenditure one of his main operating limitations. He could not afford 15 tons of bombs plus some 30 tons of gasoline and other supplies for each of the many bridges that had to be destroyed.

It appears that to "get results," General Chennault made comparisons between fighter and bomber attacks from the standpoints of effectiveness and tonnage costs, and that the comparisons were not too favorable to the bombers. This subtlety plus an occasional rather blunt remark supplied a challenge to the Falcon group.

Col. D. L. Clark, commanding officer of the group and one of his squadron operations officers, Maj. James L. Flanagan, proved equal to the challenge. They developed a "double-glide" type of bombing which is known as "glip" (Glide-Skip) bombing. As used by this group, the method has proved itself superior to other bridge busting techniques. Furthermore, Glip bombing does not render the attacking planes any more vulnerable to antiaircraft fire, and it may make them less vulnerable.

That the aforementioned mission's cost of three tons of bombs per bridge was not just a stroke of good luck is proved by the group's subsequent record. On the next Glip mission, for instance, three squadrons made 28 sorties,

dropped 34.5 tons of bombs, destroyed six bridges and heavily damaged two others, at a cost of 5.75 tons per bridge destroyed.

Results comparable to these were not achieved immediately after the Glip technique was adopted. The first Glip mission was flown on December 11, 1944. One bridge was knocked out at a cost of 12 tons of bombs. This was not bad, but the next four missions were discouraging, for no bridges were destroyed.

It began to appear that Glip was just another one of those theories that look good on paper but won't work in the field. On New Year's Day, however, things began to click, and two bridges were destroyed. During one period of two months, 19 bridges were knocked out at an average cost of 6.25 tons per bridge

Glip bombing technique consists essentially of a double-glide approach: a steep glide, followed abruptly by a shallow glide The pilot aims at a point in front of the bridge, and continues to glide until he reaches a low altitude where the glide angle is abruptly decreased. While the plane is in the shallow glide, the modified gun-sight (N-6), always preset before take-off, is used to aim at the bridge. The angle set into the sight is that obtained from skip-bombing tables, minus a correction to compensate for the glide angle. Bombs are released by the pilot from a low altitude with a smooth follow-through. Almost immediately after "bombs-away," the plane hits the deck and is free to take evasive action

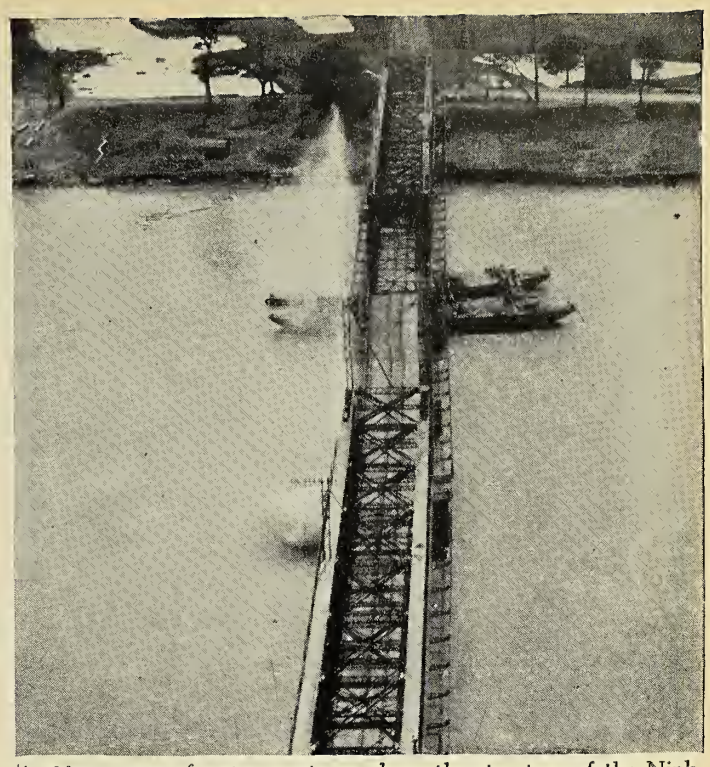
Throughout both steep and shallow phases of the glide, the deflection error is cranked-out, so that the plane is flying directly along the longitudinal axis of the bridge. Since bridge targets are usually long, errors in range that are not excessive are neutralized by length of the target.

In order for the low-flying bomber to avoid being caught in the blast or being hit by fragments, bombs are fuzed for a specific delay. With this fuzing, bombs pass through the bridge-deck and explode in the water beneath. The underwater blast is great enough to lift spans off the piers, and they drop into the water. When the explosion occurs close to a pier, the pier may be destroyed or displaced sufficiently to cause one or more spans to fall.

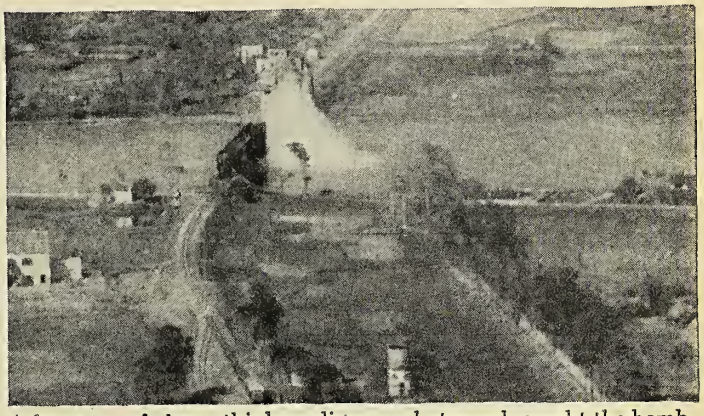
The double-glide path flown in Glip bombing is, in itself, a protection against ground fire. Neither the steep glide nor the shallow glide allows the antiaircraft gunners much time for accurate aiming, and the bombers of the Falcon group regularly strafe during the run and immediately following it Only two bombers have been seriously damaged while making Glip attacks in 159 sorties, and interrogation indicated they were not flying the correct double-glide path.

On one recent mission, perfection was attained by one of the B-25 pilots. Taking careful aim, he released his first 1,000-pounder, then waited a few seconds for the report from his tail gunner. "You got it," came over the interphone. Moments later, the same pilot was attacking his second bridge for the day. The run was made and soon the tail gunner shouted, "You did it again." Two bombs, two bridges!

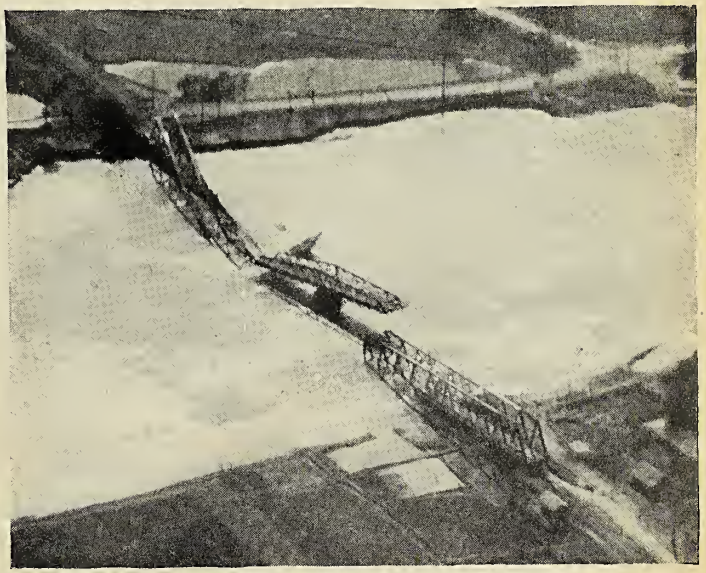
Glip bombing has been used only against bridge targets, for at this time bridge destruction is one of the more important tasks assigned the Falcon group, but it should prove equally effective against other long, narrow targets. ☆



A thin geyser of water spurts up above the structure of the Ninh Binh bridge as the Falcon bombers place an explosive underneath.



A few seconds later this long distance photograph caught the bomb exploding under the center span, breaking a link in Jap supply line



The bridge is completely glipped and one of the riverboats seen in top photograph is sinking into the waters still rippling from bomb.

Rendezvous

(Continued from Page 3)

Not So Lucky

Dear Editor:

Will you please tell me what I've been doing in hospitals for the past 6 months, and how I got hit. In March edition of AIR FORCE you printed pictures of damaged planes under the title of "More Than Lucky." At the bottom of Page 62 is a B-17, and part of the caption reads, "No one was hurt." The story is that two were killed and two wounded; both of the wounded are now at this AAF Hospital.

S/Sgt. J. F. Maguire,
AAF Hospital,
Plattsburg Bks., N. Y.

The picture, an official MAAF photograph, came to us with the information that no one was hurt. We accepted and published this fact in good faith.—Ed.

Misleading Pictures

Dear Editor:

In reading AIR FORCE, January, 1945, we took special notice of your picture in the "On the Line" column.

After having worked on major aircraft repairs for a long time in England and France on the same type of aircraft, we have no doubt that the airplane shown in a damaged condition was neither repaired nor was it possible to repair under the existing conditions on the continent. In fact, factory facilities in the States would hardly undertake such a repair.

In the first place, attention is called to Technical Order 01-1-14, stating that aircraft parts subject to fire shall not be used under any conditions. As the picture shows, the engine and firewall area were burned and the engine nearly twisted off the firewall mounts. The wings, especially the left, were torn off and twisted, which would twist the fuselage. Also, the tail section forward of the tail cone and supercharger area was twisted and buckled; only replacement of the fuselage itself would suffice. . . .

Inspection Dept.,
Air Depot Group, France

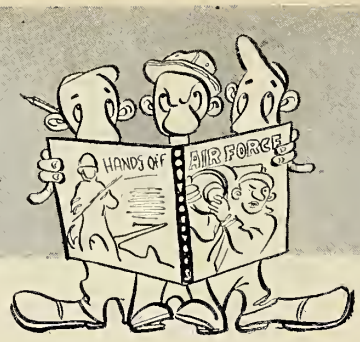
Dear Editor:

. . . If your captions mean that an airplane was built around a portion of the aircraft tail section, I may agree. If anything but that is the case, let us know what sort of magic was used, and I'll requisition a carload of it immediately. . . .

Maj. Robert E. Perinovich, APO 374

If AIR FORCE led its readers to believe that the pile of junk in the one picture was "converted" into the flyable P-47 in the other picture, we are sorry. That was not our intention. The flyable 47 was rebuilt from the remains of several damaged P-47s; Hq 9th Air Force says "she was five or six destroyed planes—no one knows the exact number." The picture of the foamite-covered P-47 was submitted by Hq 9th Air Force to illustrate one of the sources for the rebuilt job. It was published by AIR FORCE for the same purpose. Unfortunately, we

(Continued on Page 60)

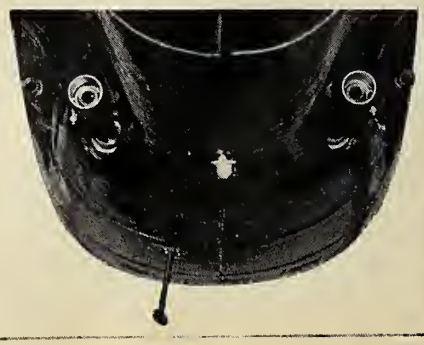


AAF QUIZ

WHAT'S YOUR AIR FORCE I.Q.?

Chalk up five points for each correct answer. A score of 90 or above is excellent; 75 to 85, good; 60 to 70, not too bad; below 60, tsk, tsk. Answers on Page 63.

1. A typical "pickaback" plane combination seen in actual combat is
   A. *ME109-ME323* C. *Zeke-Hamp*
   B. *FW190-JU88* D. *Hamp-Dinah*
2. AAF slang calls glider pick-up
   A. *Hook* C. *Tot*
   B. *Catch* D. *Snatch*
3. The Government pays about how much apiece for B-29s?
   A. *$50,000* C. *$600,000*
   B. *$200,000* D. *$2,000,000*
4. AAF group intelligence officer is
   A. G-2 B. S-2 C. A-2 D. SA-2
5. Under the GI Bill of Rights, the Government will pay annual tuition of a qualified veteran up to
   A. *$199.99* C. *$300*
   B. *$200* D. *$500*
6. In the history of air warfare, the old USS Alabama is memorable because in 1921 it
   A. *Became the first aircraft carrier*
   B. *Was the target of a famous air-sea bombing experiment*
   C. *Was first to carry antiaircraft guns*
   D. *Had a mooring mast*
7. "Mach number" indicates
   A. *Mileage, Altitude, Course out, and Course home*
   B. *Maximum capacity of a hangar*
   C. *Quotient of a plane's true airspeed divided by speed of sound*
   D. *Slang for MOS 747 (Airplane Mechanic)*
8. Photogrammetry is
   A. *Camera record of aerial gunnery*
   B. *Measurement of a plane's speed*
   C. *Systematic photography of material, especially bombs*
   D. *Surveying or mapping by aerial photography*
9. The AAF's research and testing establishment located at Eglin Field, Fla., is called
   A. *Testing Center*
   B. *Research Board*
   C. *Proving Ground Command*
   D. *Tactical Center*
10. On the average, the best weather for flying in the U. S. occurs in
    A. *Nov-Jan* C. *Feb-Apr*
    B. *Mar-Jun* D. *Jul-Oct*
11. AR234 is the designation for
    A. *An AAF reconnaissance plane*
    B. *The Army regulation on safeguarding military information*
    C. *A Jap medium bomber*
    D. *A German jet-propelled aircraft*
12. The engine on a P-80 Shooting Star can be changed in about
    A. *15 minutes* C. *Three hours*
    B. *Nine hours* D. *90 minutes*
13. In the phrase "5th Air Force ADVON," ADVON means
    A. *Advance communications*
    B. *Adjutant's verbal order noted*
    C. *Advance echelon*
    D. *A formation of night fighters*
14. An orthopter is
    A. *An amphibious helicopter*
    B. *A plane with optical sighting gear*
    C. *A reconnaissance balloon*
    D. *An aircraft with flapping wings*
15. The first B-29 Pacific base for operations against the enemy was
    A. *Hawaii* C. *Saipan*
    B. *Guam* D. *Tinian*
16. "Jabo" is the German contraction for
    A. *Yes, sir*
    B. *Bombing mission*
    C. *A .50 cal. machine gun*
    D. *A type of airplane*
17. A warrant officer (jg) and a flight officer receive the same base pay.
    A. *True* B. *False*
18. If a signal is dispatched from New York City to Birmingham, Ala., at 1400Z, and consumes one minute in transmission, at what hour standard time is it received in Birmingham?
    A. *2.01 PM* C. *9.01 AM*
    B. *10.01 AM* D. *1.01 PM*
19. AAF's first strike at Formosa was made by
    A. *5th Air Force* C. *14th Air Force*
    B. *7th Air Force* D. *13th Air Force*
20. These four 20 mm cannons are on the belly of what plane?



Development, Maintenance and Supply of Aircraft and Equipment

technique

Debugging Aircraft Cameras—Page 50

Two views of new XR-8 helicopter in air. Almost vibrationless craft features dual three-bladed rotors that intermesh, and vertical fins like a miniature B-24 tail.

The "Synchropter"

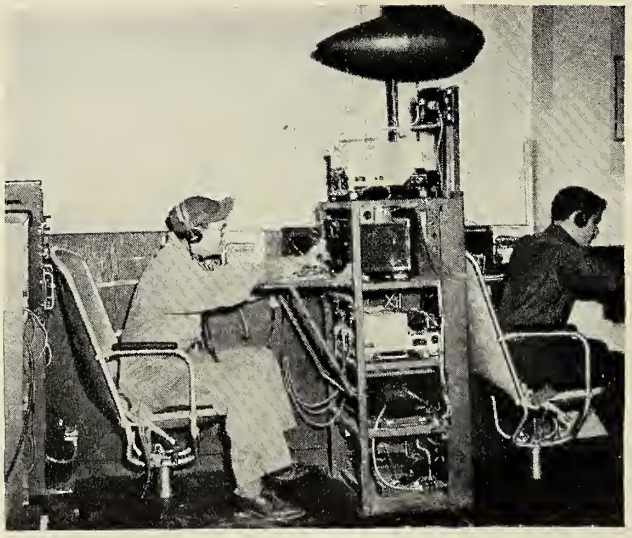
Having a profile like the nose section of a big bomber, the Kellet XR-8 helicopter—called the "Synchropter"—is now solving many of the problems that prevented previous AAF helicopter models from achieving more complete success. With twin three-bladed rotors that revolve opposite to one another and intermesh like an egg beater, torque forces are neutralized and rotor vibration is smoothed out. Weight is also saved through the elimination of long drive shafts and extension support arms that featured the rotor system of the XR-1.

An air-cooled engine developing 245 hp is housed directly behind the two-place, plexiglas-enclosed cockpit, and its semi-vertical drive shaft is geared to the dual rotors. Controls include a conventional stick, pitch control lever, and rudder pedals which give the craft directional control by varying the pitch of its rotors. Small horizontal fins that stick out about two feet from each side of the fuselage near the tail improve longitudinal stability during forward flight, while vertical fins on a later model provide added directional stability, giving the XR-8 a miniature B-24 empennage.

Individual rotor diameter is 36 feet, but the hubs are four feet apart, making a total rotor span of 40 feet. Gross weight of the new helicopter is approximately 2,900 pounds.

Combined Crew Trainer

In order to provide more realism in training and to generally improve the effectiveness of combat-procedure exercises received by aircrews, a "Combined Crew Trainer" has been developed by the 9th Bomber Command for pilot, navigator, bombardier and radioman.



Simulating positions in bomber interior, radioman sits behind navigator in combination crew training arrangement which gives realistic combat exercise to all members of crew but gunners.

The pilot receives training in instrument assembly pattern, basic instrument procedures and confidence in his instruments, precision flying, following the bombardier's Pilot Di-

rection Indicator, and radio procedures to include proper frequencies for different purposes. The navigator obtains practice in DR navigation, radio navigation, and the use of various radio aids. The bombardier is exercised in the procedure and technique of making a PDI bombing run, pilotage, manipulation of bombing switches and teamwork with other crew members, while the radioman is trained in standard signalling procedure, liaison set tuning, use of codes and working with D/F stations.

Before using the trainer, the crew members and the operating personnel are briefed for the mission as though they were actually being readied for a flight over enemy territory. Information is given on weather, route, signals, diversion airdromes, air-sea rescue procedure and the target. Everyone then takes his position and after an interphone check the mission begins.

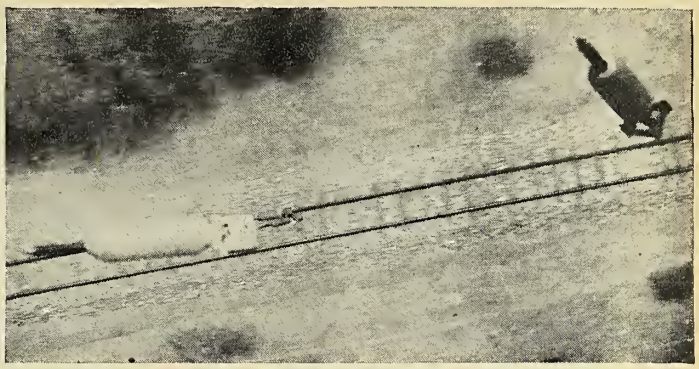
Because of the limitations of the Link, flight is started at from 5,000 to 10,000 feet, with an instrument assembly pattern being flown before climbing to normal operating altitude. Beginning with the take-off, the navigator plots his DR course by means of a set of remote instruments, and continues it until the end of the problem. Course is flown to the target area, where the bombardier, seated in the bomb trainer building, takes over direction through his bombsight and the Pilot's Direction Indicator. On completion of the target run, the navigator again takes over and directs the pilot back to base. During this time the radio operator is transmitting and receiving messages over his liaison set, and is obtaining radio fixes and headings on the radio compass. All men are able to converse with one another over interphone, liaison, command channels and VHF channels, and at the end of the mission a critique is held.

To add realism to the training mission, many modifications may be added, such as diversion to another target or base, ditching emergencies, or encountering a balloon barrage.

Burma Railsplitters

During the Burma campaign, the few railroad lines available to the Japs were repeatedly bombed by flyers of the 10th Air Force, but seemingly with little success. The fault was not with the bombardiers, for their accuracy was above reproach; rather, the bombs were striking the steel tracks and then bouncing off to explode harmlessly to the side of the roadbed.

To solve this problem in interdiction, a method of attaching spikes to bombs was improvised so that when the bomb landed on the rail line it stuck there until the explosion occurred. At first, old truck axles from Ordnance salvage yards were used for this purpose, being cut off, sharpened and fixed to the nose of 100-lb. bombs. Now, however, specifications and drawings have been received in the U. S. and standard spikes are being developed for hundred-pounders. To fit in the B-25 bomb bay, they are 14½ inches long, while spikes for B-24 loads are 17¾ inches long.



Spiked 100-pound bombs drop on a railroad line in Burma. The sharpened points hold them between ties until they can explode.

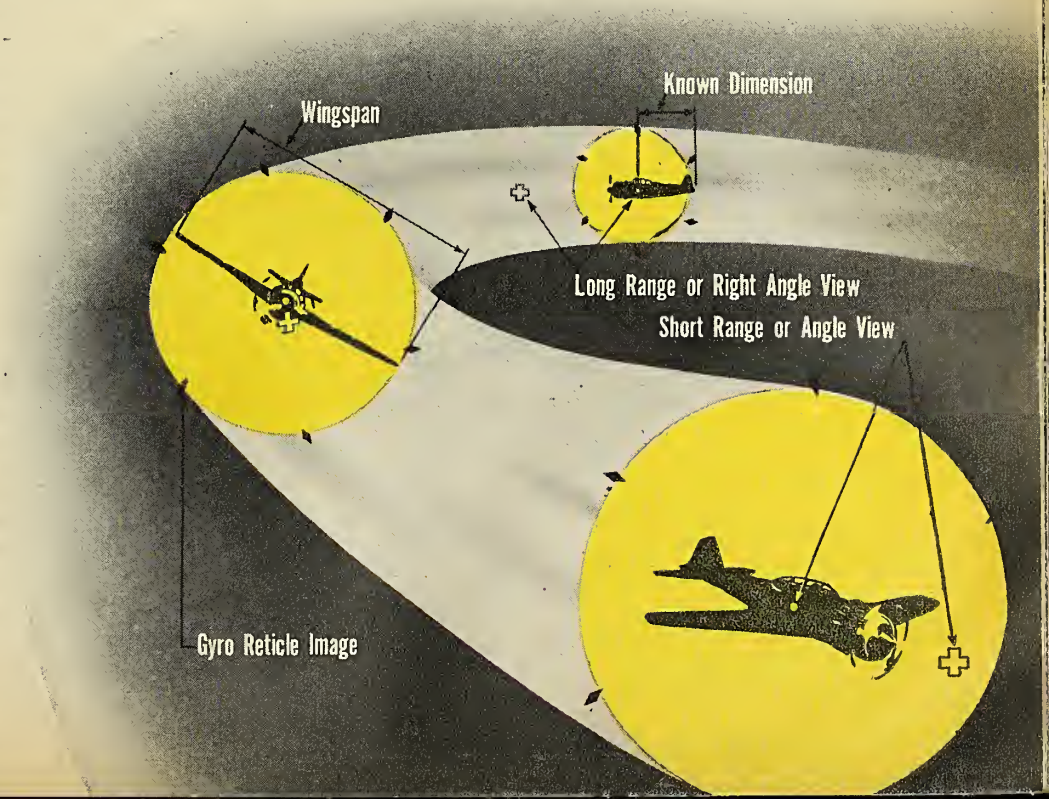
Gyroscopic Gunsight

A new gyroscopic gunsight, invented by the British and manufactured in the United States, is now helping AAF fighter pilots to bring down increasing numbers of enemy planes, and has proven especially effective against the jet aircraft the Germans have recently used.

"With the old optical sight," says Capt. Louis N. Vacca, one of the men who played a leading role in having the gunsight installed in the 8th Air Force's fighters, "anything but a burst of fire directly astern of the enemy was a guess. Now the pilot can 'clobber' his target from any angle and it has more than doubled his effective range."

In operation, a circle of six diamond-shaped lights with a dot in the center is reflected before the pilot's eyes. The pilot looks through the circle of diamonds at the enemy aircraft, and sets a lever on the type of aircraft he is attacking to govern the diameter of the circle according to the plane's wing span. He then twists the grip of his throttle, which widens the circle as the plane becomes larger on approach, and the gunsight automatically computes the necessary lead for the enemy target, keeping it within the circle until the flyer can get in a burst.

Using the new gunsight, pilots of



In operating gyroscopic gunsight, pilot manipulates six diamond-shaped lights, expanding the recticle image to follow the increasing size of the approaching target plane. The gunsight then automatically computes the required lead, keeping enemy within circle while guns blaze away.

tech topics . . . about aircraft and equipment

Newest production models of the P-51 will have aluminum radiators which weigh only half as much as copper ones now in use. Recently perfected brazing process makes possible the use of aluminum here for the first time. This weight-saving factor for radiators may also be adapted for P-38s and P-63s.

Droppable, bomb-shaped auxiliary wing tanks are being made of transparent cellulose-acetate plastic. The idea is to save metal, but it has other advantages, since pilots can watch gasoline level, and observe any malfunctions in pumping devices. Small, two-bladed, controllable pitch propellers are also being made out of a new plastic material having a special cotton fabric base . . . Flight Surgeons' medical kits, made of plastic laminate, may replace familiar leather bags.

An R-4 helicopter, anchored atop White Face Mountain in Vermont, is being used as a whirl test rig to study ice effects on the rotor blades. A proposed permanent helicopter test stand at Wright Field is to be 50 feet high and will permit testing rotors up to 100 feet in diameter.

Yarns spun from chicken feathers make up a new experimental fabric for the intermediate flying suit. Lightness and thermal insulation qualities of the cloth are its desirable features. An external switch for electrically heated suits permits turning off body heating elements yet permit heat to go into gloves and boots. . . . A tiny electric wire, only a few thousandths of an inch in diameter, but

which will carry necessary voltage, is being considered for use as thread for sewing up electrically heated flying suits. . . . Modifications being made on test samples of the Intermediate Flying Suit include a permanently attached suspender, cloth reinforcements at the elbows of the jacket and a full rayon inner lining for both jacket and trousers. . . . Latest Anti-G suits are being fabricated of a finer material that permits more flexibility. Brass weights also will replace lead weights in the G-valves to increase their durability.

A new lightweight flux-gate compass has been developed for use with the F-1 automatic pilot. If tests prove satisfactory, the new compass will be substituted for heavier, standard types, saving 50 per cent weight. . . . High-speed, jet propelled aircraft have necessitated a new rate-of-climb indicator which has a dial range from 0 to 10,000 feet per minute. Conventional instrument (Type S-1) has dial range up to 6,000 feet per minute. . . . Experimental type G-2 true airspeed indicators are being designed with a speed range from 150 to 700 mph. They will operate at altitudes up to 50,000 feet and at any temperatures encountered in these strata.

So crew members, after a ditching at night, can find their respective life rafts, a small light has been installed in rafts to mark their location. The light is so designed that its battery is activated by sea water the instant the life raft strikes the water.

Two-switch control may be adopted to replace single switch for retractable landing lights. It allows separate operation of the retracting motor and the light. . . . Latest approach light, now being tried experimentally, has individual candle power twice that of present standard type D-1 lights.

To make training more realistic, engineers have developed an engine noise simulator for installation in various type flight trainers. . . . Development work has started on a mobile navigation trainer for use by replacement centers and Air Forces overseas. The trainer will be housed in a semi-trailer and will be used to teach all phases of navigation to ten students simultaneously. . . . The life history of an engine during flight, continuous engine speed, manifold pressure used, application of War Emergency Power and total power-on time now can be obtained on a mechanical Engine Data Recorder. The instrument, which weighs about 3½ pounds, is intended for installation in engine nacelles of all aircraft.

A new device for stereoscopic viewing of aerial roll film permits looking at third dimensional photographs without the necessity of cutting the roll into individual picture frames. A series of rollers and adjusters compensate for the overlap of the separate photographs in the roll. Photo technicians have also worked out a continuous roll film printer which will print pictures from a roll of negatives 400 feet long. Previously, roll film half that length was the maximum that could be processed in a standard printer.

the 357th Fighter Group, commanded by Lt. Col. Irwin H. Dregne, recently shot down 56½ Nazi planes on a single mission.

Can You Solve These

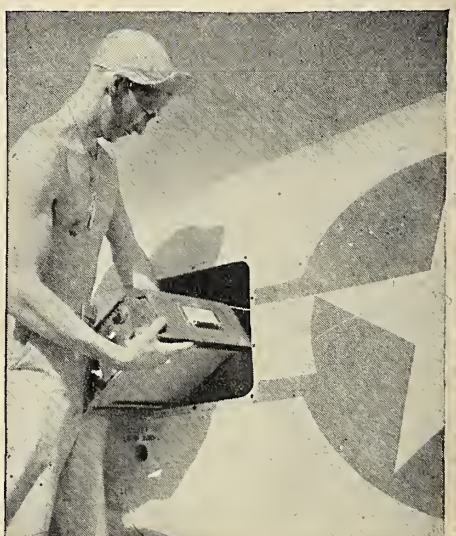
The AAF has requested that ideas directed toward the solution of the following problems be forwarded to the National Inventors Council, Department of Commerce, Washington 25, D. C.

1. A lightweight, reliable, simply installed thrustmeter for aircraft installation, combined with a torquemeter, if possible.
2. A shock absorber that does not require the use of synthetic packing to retain the fluid in the strut.
3. A control cable having a coefficient of expansion close to that of aluminum alloys used in aircraft structures, or an equivalent mechanism that will take up cable slack.
4. To determine methods of fabricating quartz hairsprings and diaphragms for use in watches, aneroid barometers, altimeters, airspeed indicators and rate-of-climb indicators.

Debugging Aircraft Cameras

Because the defects in aerial camera equipment do not become fully apparent until the plane has completed photographic work under actual combat conditions, many modifications and improvements are necessarily executed in the field.

In the case of the B-29, the cameras were originally mounted in a rear section of the plane which was not pressurized, and once the cabins were under pressure, it was impossible for anyone to reach the photo apparatus.



Camera specialist is here shown changing a magazine on an aerial camera used on a P-51.

Electrical cables to the intervalometers in the nose of the Superfort were missing, male A&N plugs were located where female plugs were needed, and since the camera doors did not close tightly, the lens became coated with grease, oil and mud on every take-off.

When fuzzy photographs were obtained at first, it was generally thought that this was due to failure on the part of the crew to open the vacuum valves after take-off. Tests however, soon proved that the vacuum lines were too small in diameter and it was neeessary to rebuild the camera vacuum system. After a simple modification was instituted, needle-sharp pictures became the rule rather than the exception.

At one of the early B-29 groups in India, it was discovered that the Superfort could not accommodate the photoelectric cells needed for night missions. Maintenance crews worked feverishly around the clock, drilling and cutting holes in the fuselage and floor plates so that the cells might be installed. Other difficulties were due to mechanical and climatic considerations, but one by one these problems were tackled by camera experts and eventually overcome.

A further camera bugaboo uncovered recently in another theatre, was the necessity for operating multiple-camera installations simultaneously so that the overlap in the photographs provided the same area coverage in any given strip of pictures. A timing device was therefore developed to operate as many as seven cameras in synchronization from an airplane and affords a uniform percentage of overlap in all photos taken from the same altitude.

A-26 Maintenance

Improvements in speed, range, maneuverability, firepower and bomb-carrying capacity are important considerations when comparing the A-26 with its A-20 predecessor, but equally vital is the greater ease with which the Invader may be readied for its combat duties in the air.

Interior attachments on the A-26 give it smaller wing-to-fuselage fairings, greater structural strength, a cleaner exterior and less sheet metal work. The dual wing spars result in less torsion of the wing, while use of heavier skin reduces wing panel repair. Both fuselage and wings are built in one piece, providing more rigidity and fewer fittings. Moreover, a noteworthy advance has been made in the "aft flight control mechanism," a compact grouping of all surface control cables in the tail, which

maintenance tips . . .

from the crew chief's stand

The committee for rehabilitation of P-51 tail wheel casings sends a strongly worded note of protest to pilots who commit "atrocities" against rubber treads by improper taxiing methods. Maintenance men should remind their flying officers to land with the tail wheel locked until the plane has completed its landing roll; then unlock the wheel before turning.

Troubleshooting shooting troubles, armament specialists of the 5th Bomber Command submit the following notes for gunnery modifications on B-24s:

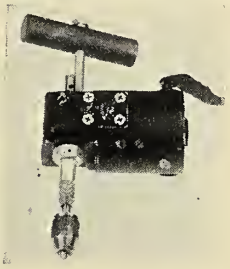
1. To increase the cone of fire for waist guns and to give gunners more room, add three braces to lift the gun approximately six inches toward the center of the waist window and about the same distance out of the window.

2. Older Liberator models have Edgewater adaptors on waist guns, with four bolts on the back plate, making it difficult to perform maintenance on the gun while in flight. A Bell adaptor with a modified yoke is therefore recommended, since it has only three thumb screws and makes it simple for rapid repair.
3. It was found that when the rear turret was turned to a 45-degree angle from the longitudinal axis of the plane, the slipstream caused the spent links to be blown over the receiver of the guns, catching in the ammo belts. By putting a small deflection plate—six inches long by two inches high—on the side of the plane, the wind may be deflected and gun failure eliminated.
4. The old link chute for the nose turret is too small and it may frequently jam. Replace this by the upper link chute, which is larger.

On fully fifty percent of P-38s being ferried to their bases, improper handling by personnel has resulted in the plexiglas pilot's canopy being cracked. Bolts attaching the rear hinge should be installed so that they may be rotated by hand after the nuts are put in place. If the hatch is in full open position in a strong prop blast, or if it is violently thrown, pressed or pulled back, cracks will result.

Our maintenance line-up this month includes lining up the cotter key holes of the B-24 engine mount bracket ring attaching nuts. Considerable difficulty has been experienced in this connection during engine change, and in order to obtain the prescribed torque and still align the holes, the use of shims is required. Where normal variation of dimensions of affected assemblies make this necessary, it is recommended that a 3/16" long slot be used to replace the present cotter key hole in the threaded shank of the bracket stud.

Says "drill" Sgt. James L. Sullivan, Heavy Bomb. Dept., Flight Test Section, Armament, Eglin Field, Fla., "The problem of obtaining electric drills may be somewhat alleviated by converting a Martin Ammunition booster motor in the following manner. Remove sprockets from each end of the booster motor and mount a ¾" bolt drilled out to fit snugly over the sprocket drive. Sweat the drill chuck, drill chuck screw and drives into the bolt. Next, remove power jacks from motor and replace with lead wire about six feet long, with a plug on it adapted to the 24 v. socket of a heated suit jack box. The speed of the drill may be adjusted by using rheostat control on suit heaters located in various sections of the aircraft."



On B-29s, you may find that the upper surface of the wing flap, which contacts the fuselage fairing, becomes excessively worn. This is a design defect that has recently been discovered, and while action is being taken to correct production airplanes, Superforts on the flight line will have to be modified in the field. To remedy this condition, install thin chafing strips of cork, impregnated rubber or similar material.

Ringing the bell, is a new TO on the installation and adjustment of the AN/APS-13 electronic set, providing both visible and audible warning of approaching aircraft. Tech Order advises locating warning bell where it can be heard by pilot only, and not be mistaken for bail-out bell by crew members. Supplementary information includes outline drawing of transmitter and receiver, cording diagram, antenna system and transmission line charts. TO number will be forthcoming in this column as soon as it is available.

translates itself into minimum variation in cable tension due to its central location. Accessibility for adjustment and repair is a feature of the system, since a single inspection door exposes the entire unit.

It is in engine accessibility, however, that the A-26 solidly establishes its maintenance superiority over the A-20. Power plant nacelles, which must accommodate engines, mounts, connections, landing gear, lubricants, gasoline and various operating systems, have been especially designed for speedy engine removal, convenient repair and ready exchange of necessary parts. Mounted on only six bolts, these power plant installations are completely interchangeable and can be replaced within two hours. Each nacelle contains a working platform, and by removing an access door forward of its location, a mechanic can climb up into the nacelle and sit there comfortably while working on electrical and hydraulic units, fuel lines and engine-driven accessories.

Deflector plates on leading edges of the wings are removable for access to all fuel lines, electrical wiring and control cables, and a similar removable-plate arrangement has been incorporated lengthwise along the fusclage. Through the bomb-bays, entrance is made to all bombing equipment, wing attachment fittings, gunner's sighting station, electrical flap operating mechanism and hydraulic units that operate the bomb bay doors.

Bombs are hoisted from built-in fittings, while 50 caliber ammunition is loaded through an opening on the underside of the nose installation for forward guns and through removable domes on the upper and lower turrets for the turret guns. Wing-gun ammo is loaded through a series of doors in the upper surface of the wings.

Certain modifications inevitably wait upon acrial operations to point out their need. One of these was the relocation of the battery from between the firewalls behind the engine to an open and accessible spot in the wheel well. Another such alteration was the replacement of the Dural bombsight mount by ¼-inch steel plate, which reduced vibration.

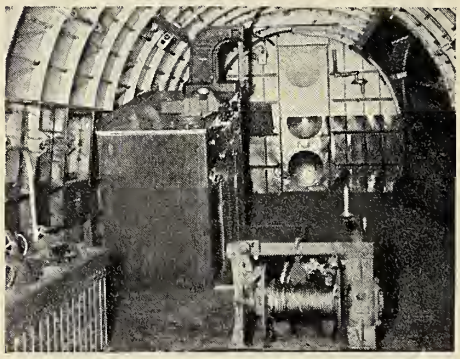
Changes affecting the plane's combat performance are also the fruit of A-20 experience. A striking innovation is the double-opening cockpit canopy which is released by a handle placed directly over the pilot instead of far back almost out of arm's reach. Other cockpit improvements include a control device which locks all surface controls and throttles, an inspection window in the floor to check on position of the nose-wheel, centrally grouped landing gear position lights, and independent master and battery switches so that flaps or prop feathering pumps may still be operated in case the engines have to be cut. The electrically operated wing flaps extend back and down with a 55-degree arc of travel and consist of two overlapping sections which obtain increased reaction from the air flow to decreace speed and increase lift. New magnetos on the engines produce a higher voltage and a hotter spark, while improved contact points render pressurizing unnecessary and eliminate much difficulty with cables, harness and fittings.

Flying Repair Shop

A converted C-47, assigned to the 15th Air Force, now serves the Mediterranean Sea area as a flying aircraft repair shop. Answering emergency calls far from the Control Depot, the "Depot Belle" is equipped to handle almost any type of third echelon maintenance and repair operation. Items carried aboard include a 24 v. put-put, a 110 v. generator, C-1 instrument test stand, hydraulic test stand, drill press, air compressor, arbor press, grinder, welding equipment, lathe tools and complete kits of specialized engineering apparatus.

Major Harvey J. Neeld, depot engineering officer, was assigned the task of making the conversion by Col. Monty D. Wilson, commanding officer, and was assisted by Captain Alvin Greenhorn, M/Sgt. John M. Ayers and Sgt. John C. Vaughn.

One of the first jobs undertaken by "Depot Belle" was the repair of a grounded P-38 some 600 miles away. Previously, such a mission required a truck crew traveling over winding mountain roads and remaining in the field between seven and 16 days. The flying repair shop performed the job in 36 hours.



Main cabin of C-47 modified as aircraft repair plane, looking aft. Shown are bench, cabinet, vise, arbor press and engine hoist.

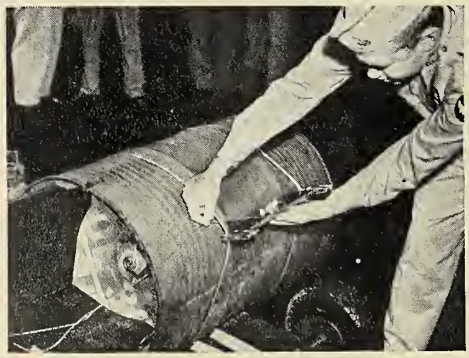
Exposure Suit for Airmen

What the well-dressed crew member will wear in hazardous missions over the North Atlantic and the Aleutians may very well be a newly developed aviation exposure suit which has recently been successfully tested by air and naval services of Canada and the United States.

This important contribution to the saving of flyers forced down at sea is a lightweight, waterproofed garment which can be pulled over a regular flying suit and which keeps its wearer bone-dry from his Adam's apple to the tips of his toes. Since body heat escapes 25 times as rapidly in water as in air, the suit will vastly increase the chances of rescue for downed pilots and air crews before they succumb to exposure and shock.

At present, the new garments are made in several designs and of various

The AAF is pitching its fireball in Pacific strikes



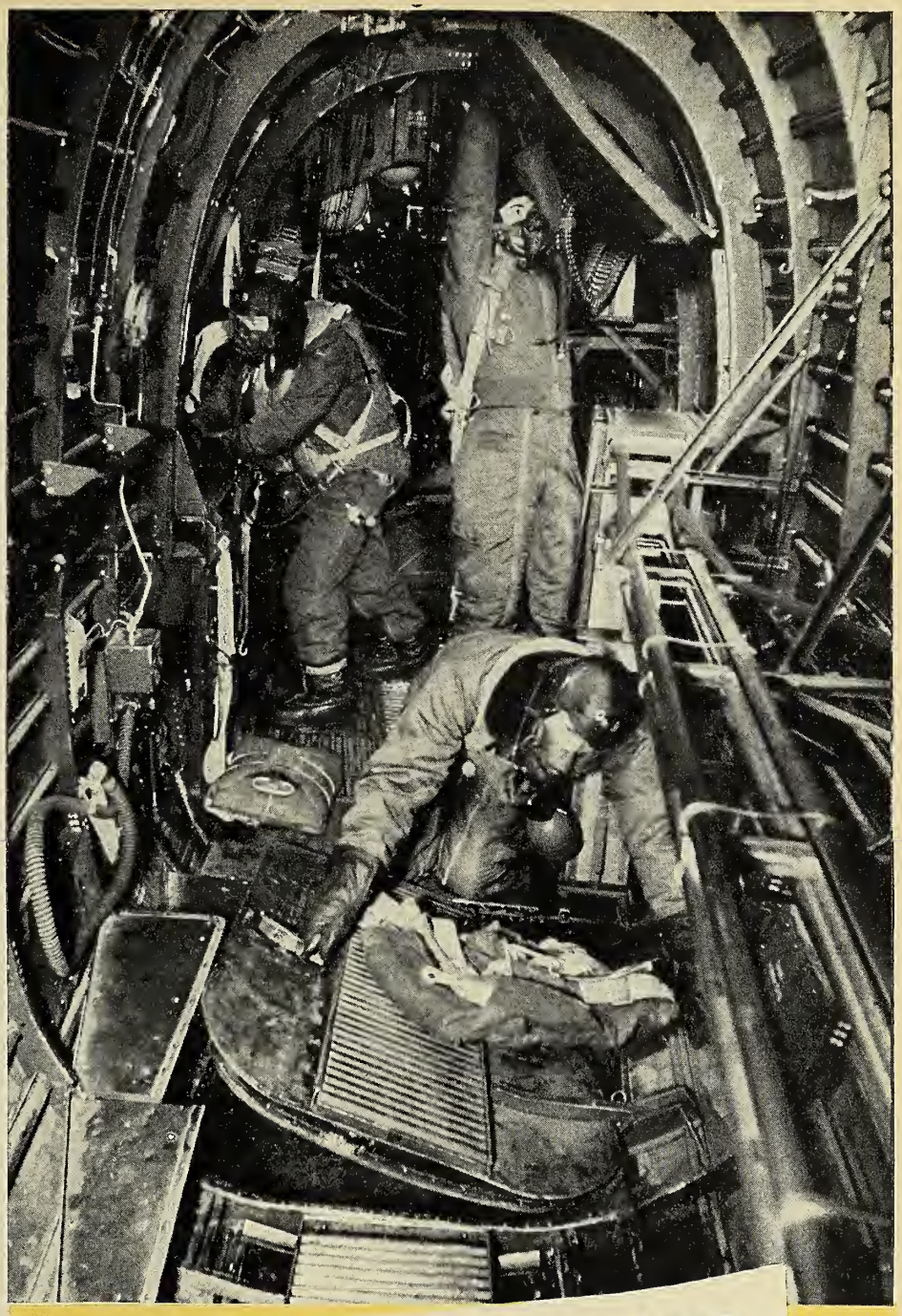
Using gasoline and a special powder in proper amounts, a highly inflammable viscose gel is packed into 55-gallon drums to cover a 300-foot area with flame. At left, man demonstrates shackle connection, while at right, firebombs fitted with plywood fins are being salvoed.

fabrics, and are especially adapted for the protection of personnel against the loss of body heat. In actual tests conducted in cold water off the coast of Labrador, a group of volunteers clad in the exposure suits were able to bob around in the water or remain aboard life-rafts for hours on end without complaint. When they tried to do this without the protective apparel, however, they clamorously sought relief within an hour.

In charge of the entire project was a joint committee made up of representatives of the Emergency Rescue Equipment Section, operating under a directive of the joint U. S. Chiefs of Staff, U. S. Navy, AAF, U S. Coast Guard, office of the U. S. Quartermaster General, Royal Canadian Navy, Royal Canadian Air Force, and the National Defence Research Council. The committee agreed that work should proceed immediately on a development program to combine the best features of all garments tested into two basic units: (1) a suit for aircrews who have no chance to put on a suit before ditching or bailing out, and (2) a suit which can be donned in the shortest possible time before abandoning the aircraft or which can be included in the emergency kits and donned after boarding a life-raft. It was further pointed out that much of the present emergency equipment is practically useless in a large number of cases, since floundering airmen are unable to use it because of the cold. In the North Atlantic tests, volunteers attired in the exposure suits were able to open and enjoy their emergency rations as well as operate radio sets. They were also able to right an upset dinghy with comparative ease, a feat difficult if not actually impossible in a water-logged flying suit.

Radial Engine Mockup

Recently adopted as a standard AAF training device, the Trainer, Mockup, Type 0-58 (Radial Engine) has been designed for classroom instruction in the basic principles and operation of a Wright Whirlwind nine-cylinder radial



what's wrong with this picture?

When the egress signal is given at high altitudes, the idea is to get out as quickly as possible—and that means using escape equipment correctly. These three sufferers from aerial claustrophobia are all up in the air about TOs 03-50-1, 13-1-3, and 13-5-2, and are supposedly committing nine mistakes. But look before you leap to Page 55 for a straight up-and-down accounting, and you may find several more that are being "hatched." The plane is a B-24 and the costumed performers are S/Sgt. William W. Yaeh, Sgt. Ralph P. Ellefson, and Pfc. Jack R. Seifert, all of Squadron H, 4000th BU, Wright Field, Dayton, O.

engine, and is currently being distributed to field activities.

The device is a manually operated, animated cross-section of a radial engine with synchronously movable crankshaft, master rod, articulated rods, pistons and valves. Firing is represented by properly timed illumination of miniature electric blubs powered by two six-volt dry cell batteries. Timing is demonstrated by a transparent timing plate and a rotating pointer, while the plate is graduated at five-degree intervals and is numbered every ten degrees.

The mockup is made of wood, masonite and plexiglas, and is finished in different colors to distinguish the various parts and give a three-dimensional effect. Detachable legs support its 48-inch height in a vertical position.

Information on this device may be obtained by writing through channels to the Training Aids Division, One Park Avenue, New York 16, N. Y.

New Glider Giants

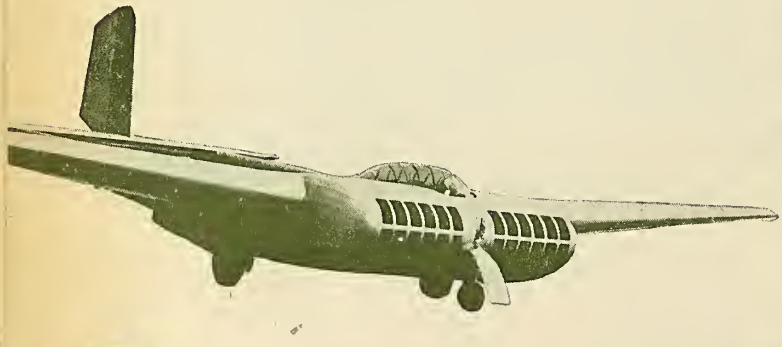
Two huge engineless cargo carriers, now completing flight tests, have been developed by the Glider Branch of the ATSC Aircraft Laboratory to meet combat-inspired needs for gliders capable of carrying heavier and bulkier battle equipment by air. Designated as the CG-10A and the CG-16, both of these transports are considerably larger than either the CG-13 or the CG-4A—two of the biggest AAF gliders now in combat. Both have all-wood framework covered by thin plywood skin, and both designs incorporate tricycle landing gear with retractable nose wheels which put cargo sections close to the ground and function better than conventional gear or skids on rough terrain.

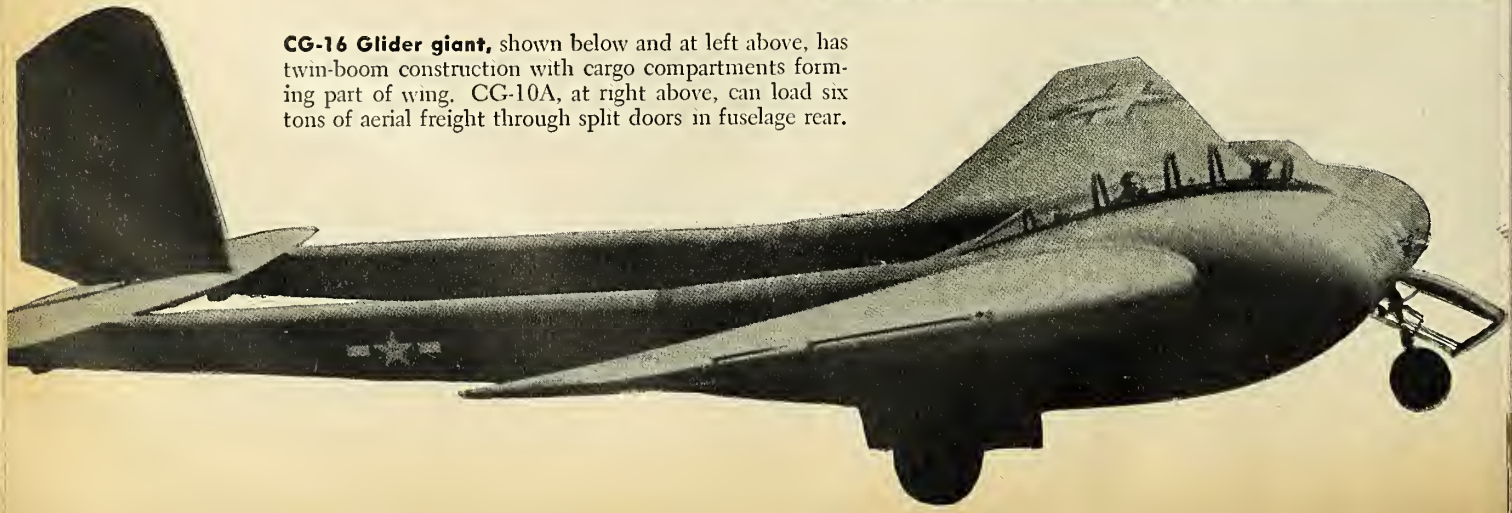
Largest of the two craft is the CG-10A, already in production, which has a wing span greater than that of a C-47. Six tons of aerial freight can be loaded through the split door in the rear of the fuselage, and the cargo interior, almost 30 feet long, seven feet high and 8½ feet wide, is the only glider cargo space large enough to accommodate a fully assembled 135-mm howitzer or a 2½ ton truck. Troop doors, one on each side of the fuselage, enable forty fully equipped infantrymen to jump clear in less time than the same number could get out of two C-47s.

The CG-16 is a twin-boom, single-tail glider that is slightly smaller than the CG-10A and has a wing span of 91 feet, 9 inches, a length of 48 feet, 3 inches and has many flying wing design features, including a cargo compartment that is actually an enlarged part of the center airfoil section. The leading edge of the fuselage section is in reality double pexiglas doors lifting upward by means of hand-operated jacks, while the forward section of the cargo floor is hinged to form a loading ramp when lowered. Twin cargo compartments will carry a jeep in each section, or one 75 mm howitzer, and troops sit in rows as they do in a motion picture theatre. Another difference is that unlike the CG-10A, in which pilot and co-pilot sit side by side, the cockpit of the CG-16 is set on top of the wing-like fuselage and is arranged in tandem.

Scoop for Bomber Loads

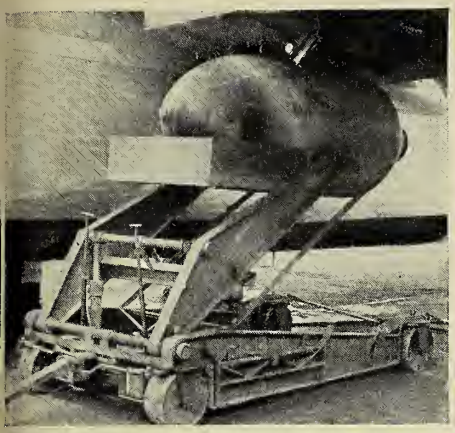
Built-in bomb hoists in AAF bombers have solved the problem of getting aboard the heavy bomb loads, but hoisting the bombs for external wing racks has necessitated the development of new devices. Latest experimental type is a four-wheeled hydraulic lift that literally scoops up the 2,000-pounders, raising them into position.





CG-16 Glider giant, shown below and at left above, has twin-boom construction with cargo compartments forming part of wing. CG-10A, at right above, can load six tons of aerial freight through split doors in fuselage rear.

Of steel construction, the lift consists of a large scoop-like platform that slides beneath a bomb and cradles it. A hydraulic jack mechanism then raises the bomb to its rack.



Hydraulic scoop lifts bombs to wing racks.

WHAT'S WRONG with the picture on Page 53

1. Take three men, subtract their goggles, and the result is frozen faces and eyes when they jump out into the sub-zero temperature of the high altitude.

2. You in the foreground—aren't you forgetting something? Overlook the 'chute and do your bailing out bareback, and you'll have the dubious distinction of being the first one to land.

3. And doesn't your oxygen mask need a face-lifting? You won't get the proper oxygen supply if you wear it too low on your face.

4. Is you is or is you ain't—pushing? We're asking the man at the left who seems to be applying his weight to the waist door in what our gagman would describe as waisted effort. Stencilling on the hatch should clearly indicate that it may be opened by pulling inward.

5. There's no time for chivalry now, but nevertheless you do have your Mae West on wrong. It should be under, not over, the parachute harness.

6. Seems like a Mae West sister act with another one hanging over the waist door. That's no place for a lady!

7. The bail-out bottle tucked in your trouser leg will be of no use to you whatever unless the little tag is removed—so pull it out or you'll be playing tag with asphyxiation.

8. Now for the man who has succeeded in getting the other waist door open. He's preparing to leave the scene, but unless he connects his oxygen, he'll *really*, be out of the picture.

9. For all practical purposes he might as well be on TD in a nudist's colony —what with his Quick Attachable 'Chute Harness unfastened, his parachute on the floor and his Mae West hanging around unescorted.

on the line

with mechs around the world

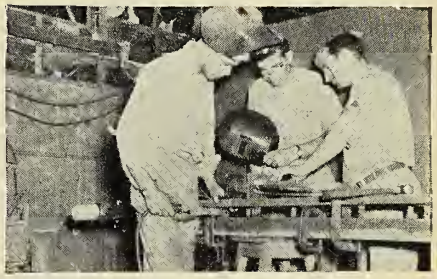
"What gripes me most of all," said T/Sgt. Arthur P. Beese, a B-17 engineer-gunner who participated in 30 missions over Europe, "is to see a flak-ridden bomber fight its way home, only to crack up in landing. Often it's merely a matter of brake failure due to a battle-damaged hydraulic system."

To help prevent such accidents, Sgt. Beese devised an emergency brake whose main feature is a pressure accumulator located near the brake drum and closed off from the hydraulic manifold by a stop valve controlled from the cockpit. In case of damage to the regular hydraulic system, the accumulator serves as an emergency pressure reservoir to operate the brake.

Charged with reclamation work at the keystone air depot of the CBI Air Service Command, M/Sgt. Dale K. George, Altoona, Kansas, found himself confronted with some unusually rough salvage missions when planes crashed in inaccessible regions and had to be brought back for rejuvenation or spare parts duty. As a veteran of 2½ years' service in India, Sgt. George is familiar with the terrain, and knows that it requires something special in the way of equipment. He therefore designed and constructed a salvage vehicle, fitted with a crane and winch arrangement, with which he is able to pick up and load almost anything anywhere. The apparatus has earned him a membership in the "CBI Service Chiefs," area honor society.

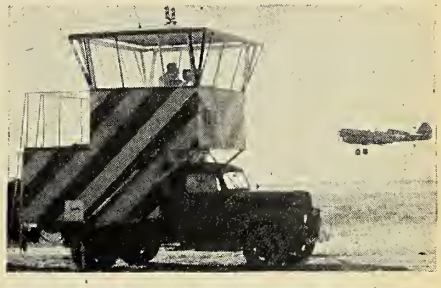
An important link in ground-to-air communication in fighter-bomber tactics is the SCR-522 radio unit—now maintained in prime operating fettle at a fighter squadron base in Italy by a home-made test set designed by T/Sgt. Raymond Washington. Constructed out of parts salvaged from wrecked planes and from scrapped radios, the tester makes it possible to give a quick, positive check on plate, grid, filament, relay and receiver voltages, as well as on the dynamotor noise ratio in a.e. voltages.

A dummy antenna connects to the SCR-522 through a coaxial cable, and is provided with an adjustable load and visual indicator to reduce the radiation of the radio frequency signal during tuning of transmitter and receiver. This device also denotes excess oscillation through a grid leak bias-type vacuum tube circuit and plate current relay, which can be adjusted to indicate a vibration level of .2 volts and up. A half-wave rectifier is built into the test set to supply power for the signal generator so that the use of batteries may be dispensed with. Voltages required are 110 v. ac or 24 v. dc, both of which can be supplied by field power units.



Credited with the design and construction of a number of weld assemblies in addition to towbars, cranes and special jigs, M/Sgt. William W. Johnston, Phillipsburg, Penn., is here shown instructing two assistants in the procedures he developed at his ASC depot in the India-Burma area.

A contributing factor to the efficiency of a 15th Air Force service squadron is this prop balancing stand built by S/Sgt. Samuel Calvert, Cove, Ark., (left); Norman F. Smith, E. Brady, Pa., (center) and Richard R. Ruff, Syracuse, N. Y., (right).



Two mobile runway control units are helping incoming pilots to land safely at domestic bases. Above, 1-½ ton truck surmounted by glass-enclosed tower housing radio equipment was made at Peterson Field, Colo., while at MacDill Field, Fla. (below), a B-17's nose has been installed on top of a small truck. Both units are equipped with portable power generators, can be used as emergency towers.

BURMA RFD

(Continued from Page 23)

vividly remembers having Jap AA fire coming at him from above instead of below when they dropped supplies into a valley while the enemy was firmly entrenched on the hilltops.

Workhorse of most of these operations was the old standby, the C-47, but many C-46s were also used—and found very efficient. Carrying 40 percent more cargo than the C-47, the C-46s maintenance problems seem to have been licked, making it a popular plane on the Burma front. Loading crews developed their techniques to the point where they could load a C-46 in an hour and a half. At the advanced fields, where they traded their supplies for cargoes of wounded and enemy POW's, average time for turn-around was 30 minutes.

One day during the push I visited a C-46 base. It seemed to be mad confusion with Hindu laborers working on the taxi strips while planes took off and came in over their heads.

As a C-46 swung into the taxiway, the pilot switched radio frequencies and picked up the radio jeep on the field. He was told his exact parking area. By the time he reached it 10 truckloads of material were waiting, as was the gasoline truck and ground crew.

Before the engines were turned off, the first truck was backing up to the doors. As loading of the plane is the pilot's responsibility—weight and balance laid down in the TO must be supervised—there is no time to go up to the area for meals. So the squadron mess comes to the flyers in the form of mess tents pitched on the side of the runways and mess trailers serving hot food.

The original reason for starting Combat Cargo Groups was to set up streamlined, self-sustaining, expendable units to supply the Air Commandos in their operations in Central Burma. However the tactical situation changed to the extent where the tail wagged the dog—the Air Commandos were joined with the Combat Cargo planes to supply more transport planes and to do the tactical work. Now, in this type operation the only major difference between a Combat Cargo squadron and a Troop Carrier squadron is the fact that the former has more airplanes and fewer crews. For the Mandalay operation in the C-46 Group, it was necessary to increase the crews. About a hundred flyers were added. Twenty were P-38 pilots; twenty P-47 pilots; twenty B-24 pilots and twenty B-25 pilots. They all flew as C-46 copilots. In addition, 20 radio operators were borrowed from bomber outfits. To say that these men enjoyed this type of work would not be telling the exact truth. However all admitted they had never piled up so much combat time so quickly.

With these new types of organizations added to the older proven ones, the campaign in Central and North Burma came to a definite conclusion with the fall of Lashio and Mandalay. Organized Jap resistance in North Burma is finished—and the AAF's RFD had a good share in doing the job. ☆

GROWING PAINS OF JET

(Continued from Page 25)

wheel disc until 1937 and for turbine buckets until 1928. A British alloy, Ke-965, with a 1,200°-1,400° operating range then was used for buckets until 1933.

For 15 years after World War I, when funds were so scarce that only a few airplanes could be purchased each year, Doc Berger was the only Air Corps engineer working out the bugs of the turbo-supercharger, and trying to increase its efficiency to supply more and more air to the larger and larger engines being perfected. With Dr. Moss, he pleaded for funds—and as late as 1934 received an Army allocation of only $7,000, although cost of a single turbo-supercharger was about $25,000—and managed to keep the project alive with the help of about $400,000 from General Electric's own research budget.

Men like Doc Berger don't come a dime a dozen. He is a practical genius whose favorite formula for getting work out of new men is to "scare hell out of 'em" by firing questions until the victims are squirming with self-consciousness at their own ignorance. After more than 25 years of constant work on the turbo-supercharger, Doc still bounces out of his chair like a rubber ball to engage in vociferous table-slamming discussions on gas turbine operation. With a sly, penetrating smile, he gives you the answers, then backs them up with reports and documents.

Sometimes Doc's ideas would get ahead of engineering practicability, but Opie Chenoweth, veteran civilian engineering executive of the power plant laboratory, was one of Doc's closest friends. "This team of the ingenious mechanic and the technical expert," in the words of Col. E. R. Page—military boss over both men at Wright Field until 1943—"was one of the nation's best. Although Doc wasn't an engineer in the academic sense, he always could depend on the technical assistance of Chenoweth who had the knack of channelling Doc's development work along sound engineering lines without discouraging his inventive genius."

Doc's contagious confidence and his intense interest in making better gas turbines many times inspired others to renew their efforts to perfect materials and designs for the turbo-supercharger. Just a few months ago, Dr. Moss succinctly summed up the importance of Berger's contributions in as strong a statement as he could make: "If it hadn't been for Doc Berger, the turbo-supercharger would have ceased to exist" . . . long before it was perfected for practical use at high altitudes.

Alloy research programs, instigated by Berger between 1926 and 1936, led to development by manufacturers of high-temperature metals that gave the turbo-supercharger the efficiency and durability required for operation with our largest engines and paved the way for the development of turbo jet engines.

In 1933, the Cyclops Steel Company's alloy was adopted for buckets that could operate at high temperatures. This alloy in 1937 also was adopted for use in turbine wheel discs.

Later developmental programs led to the production of an alloy for buckets by the Haynes-Stellite Company, with operating high temperatures, and of Timken alloy for wheel discs by the Cyclops Steel Company, with operating temperatures in excess of 1,300°. These are the alloys now used to supercharge the engines of our Superfortresses at altitudes above 30,000 feet, and they are the ones being used for buckets and wheel discs in our turbo jet engines.

By early 1939, these high temperature alloys were operating satisfactorily in the turbine wheel. Thus, the main obstacle in turbo-supercharger development had been conquered.

But still the turbo did not give efficient performance, and that's when the new re-regulator and Robey test flight turned the trick.

Again it was Doc Berger, working with Lieutenant Robey (now a staff colonel in charge of all conventional and jet engine development for the AAF), who slaved at Wright Field for weeks to modify the turbo regulator for the critical test hop. But Doc Berger, who is solely responsible for the development of the supercharger regulator that made the 1939 flight test successful, already was preoccupied with another problem. Now that high temperature alloys were available, he was busy on a five-year program for developing the gas turbine as a prime mover to replace the reciprocating engine.

First step was to issue a contract to General Electric for a two-stage turbine, the first contract that might be construed as preparing the way for production of the turbo-jet engine two years later. Next, in 1940, a contract was awarded to Allis-Chalmers for development of a two-stage turbine wheel that could be geared to the driveshaft of a conventional engine, applying some of the turbine power to the propeller.

This adaptation, known as the "compound engine," was another Berger-Chenoweth step in the direction of harnessing gas turbine power. Still, this did not replace the reciprocating engine.

This was not accomplished until the spring of 1941 when the British flew successfully with the Whittle turbo-jet engine. The Army Air Forces through General of the Army Arnold, quickly obtained blueprints and an engine for examination and production.

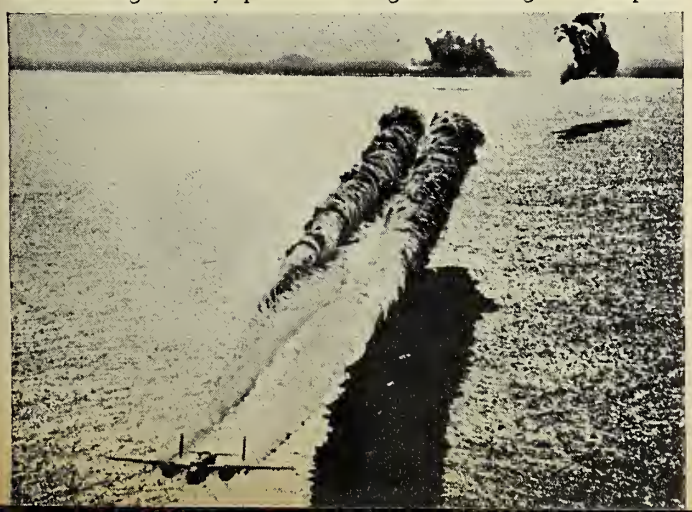
With most of the basic problems already solved for mass production of gas turbine type units, General Electric modified the Whittle engine, and by the fall of 1942 began turning out its first models of turbo jet engines for the P-59 and later the P-80. Newer jet engines now emerging from the experimental stage in Britain and the United States are the best yet developed by any nation. They are the best primarily because of the special high temperature alloys that were developed during the long and tedious experimentation program with the hot wheels of the turbo-supercharger. ☆

Doughfeet shove liaison plane ashore at Pacific base. These little planes have evacuated wounded from otherwise inaccessible terrain, carried supplies to forward bases, spotted enemy troops, directed U. S. ground troops, directed bombers to enemy targets with smoke bombs.

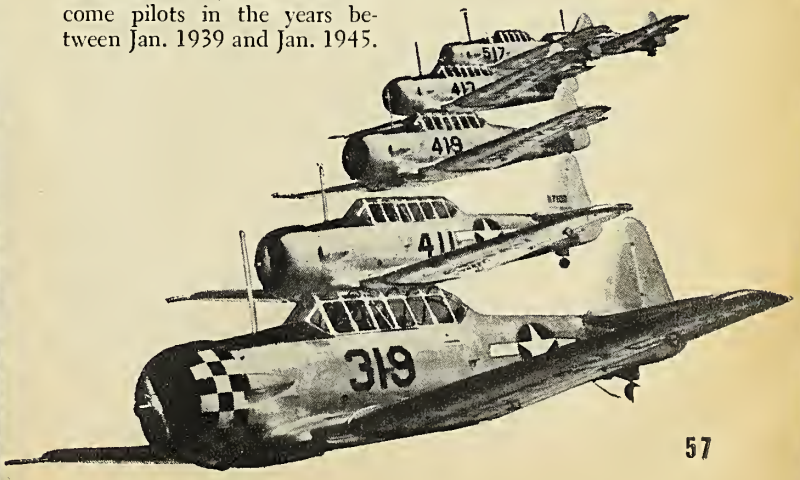
The Unsung AAF

These are the planes that never fire bullets or drop bombs, planes that get shot at but can't shoot back, planes that have to perform endless, monotonous jobs without glory

Spraying long twisting columns of black smoke, a B-25 of the Far East Air Forces screens the movement of American men and equipment from Jap shore batteries. Screen also enables bombers attacking enemy positions to gain advantage of surprise.

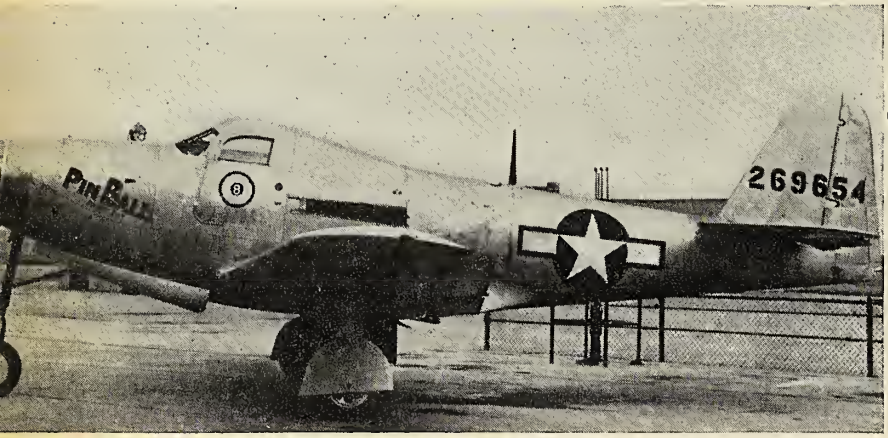


In planes like these, the AAF has trained 184,394 men to become pilots in the years between Jan. 1939 and Jan. 1945.



Not bombs, but a packed rubber life raft is installed in the bomb shackles of this P-47 being readied to participate in a dawn attack on a Jap base in the Marianas. Flying with P-47 formation, this Thunderbolt will drop life raft to any fighter forced down at sea.

Swooping low over tent quarters on Saipan, C-47 sprays thousands of gallons of DDT insecticide in fight against malaria, dengue, filariasis and fly-borne dysentery. B-25s have been equipped to spray DDT over forward areas and engage in tactical missions on one flight.



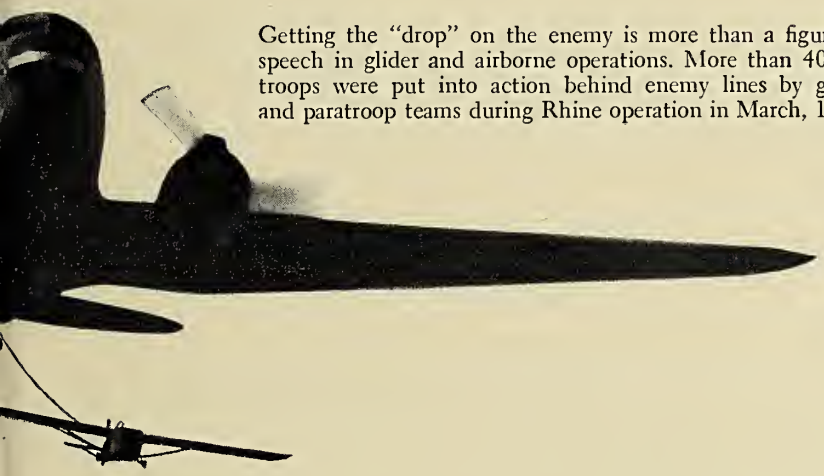
"Pinball," the P-63 target plane shown above, blinks in pleasure when gunnery trainee pots it with frangible bullets. This recent addition to AAF's training program enables gunners to perfect their technique under simulated combat conditions.

Back of every military operation—ground, air or sea—is a picture. Getting the right kind of photos is a job that goes on day and night, when there's only a 600-foot ceiling over the Moselle, from 25,000 feet over Tokyo. Here film is unloaded from P-38.

Ocean-spanning ATC planes land from Atlantic hops on the average of every 15 minutes of the day, once every 60 minutes from Pacific flights. ATC flew 300,000,000 miles in 1944, carrying men, mail, cargo like this weapons carrier which will be toted to China.

Air-sea rescue squadrons have fished AAF men out of the English Channel, the Adriatic, the China Sea, the wide Pacific. Searches for missing men have continued as long as two weeks. Here downed Pacific airmen are helped aboard "Rescue Cat" (OA-10).

Weather planes first flew in the UK, now scout weather wherever AAF planes fly. Important missions often succeed because advance units find favorable weather at target. Weather crew shown above is checking equipment prior to mission over Germany.



Getting the "drop" on the enemy is more than a figure of speech in glider and airborne operations. More than 40,000 troops were put into action behind enemy lines by glider and paratroop teams during Rhine operation in March, 1945.

Aerial wire-laying was achieved this year by ATSC and Signal Corps men who devised device, shown here on C-47, that can lay wire across any kind of terrain within 16-mile range in 60 minutes.

AAF's human pick-up system permits rescue of men in inaccessible terrain and behind enemy lines. Low-flying plane hooks nylon loop, picks up man with less strain than a parachute jump. This photo shows man pulled from ground by means of special harness.

Speak to a medical man and he'll tell you that the big three life-saving innovations of this war are sulfa, blood plasma and air evacuation. In the six months after the Normandy invasion, 100,000 wounded were flown to England, 5,000 a month to U. S.

Rendezvous

(Continued from Page 46)

do not have information on exactly what the damaged plane contributed to the other. From the looks of things, it couldn't have been much. Like our readers, we're convinced it was a salvage job rather than a repair job.—Ed.

A Stepchild

Dear Editor:

Among many other officers and men at this base I am an ardent reader of AIR FORCE. However, I would like to know if the Air Transport Command is part of the AAF. Although the ATC is frequently mentioned in the publication, its insignia is the only one left off the cover. We think we are doing our part over the Hump and throughout the China-Burma-India Theater. Don't you think the insignia deserves its place among the rest?

A Lieutenant in the
step-child of the AAF.

A mighty big and lusty stepchild you have there, Lieutenant. Technically, ATC is a Command under the Commanding General, AAF, and therefore is represented by the shoulder patch insignia at the very top of the column on our cover.

Passing the Buck

Dear Editor:

I am sitting here in my office among my telephones and wall maps, when the call comes in.

"Hello," says the lady's voice. "I want to register a complaint against the Air Forces and if you don't do something about it I'm going to write my congressman immediately."

So I ask what's the matter and she says that ever since the AAF put radar on airplanes she has been having trouble, and they're not just ordinary troubles but great big ones. Especially at night. So I suggest she describe these difficulties that our restricted and secret radio apparatus cause and she goes on as follows.

"When the airplanes fly over my house they turn on their radar and then I have a

(Continued on Page 63)

Answers to "How Sharp Are You"
on Page 2

1. C-60 Lockheed	6. No
2. Three	7. Two
3. Clark	8. Three
4. One	9. One
5. Five	10. Yes

CORRECTION: Anticipating complaints, we wish to call attention to an error in the May issue of "How Sharp Are You?" At the last moment No. 4 question and answer were changed. Due to a production slip-up, only the answer was changed in the magazine. Question No. 4 should have read, "What plane has the figure 7 on it?" The answer, second plane, is then correct.—ED.

TONY, NICK AND OSCAR 2

(Continued from Page 17)

can attest to its maneuverability. The Oscar Mark 2 can outmaneuver the Zeke. The Oscar Mark 2 also has armor plate and leak proof tanks, an indication of the extent to which the Japs have improved their aircraft.

With all these advantages, why do our fighter pilots and laboratory analysts insist that we have better combat planes? One important reason is that the firepower of the Oscar Mark 2 is relatively light. Its entire armament is two 12.7 mm machine guns synchronized through the nose cowling. While it does have leak proof tanks, the protection provided is makeshift at best, for the usual covering is nothing more than kapok fastened to the tanks. And its armor consists of a 13 mm headplate and backplate for the pilot, with no other protection.

Another reason is that our planes can take a terrific beating and still continue to fight. We have superior firepower, more and heavier armorplate, and leakproof tanks of superior construction. Perhaps outweighing these technical advantages is the fact that American pilots can think better and quicker than the Japs.

The Tony is a single-engine fighter with an inverted V liquid cooled engine and a top speed of about 360 mph at 15,000 feet. While it is the fastest of the three fighters, it is still slower by some 40 mph than the P-38G and slower by about 75 mph than the P-51C.

Its best rate of climb is at 5,000 feet where it rises at about 2,500 feet per minute. At that altitude, the 38G outclimbs it by at least 300 feet per minute, and the 51C goes up by about 700 fpm faster.

Its best characteristic is its diving speed. One of the early tactics employed by P-40s against the Japs was to make one pass and dive away. Previously, the Nips could not or would not dive with the Warhawks. However, in simulated combat against Tony, a P-40 dove at 475 mph and the Jap stayed with it.

The Tony also has respectable firepower. Tonys have been captured with three different versions of armament. One has two 7.9 mm machine guns and two synchronized 12.7 mm machine guns; another has four 12.7s; and yet another has two 12.7s and two 20 mm cannons.

The armor plate on the Tony consists of a 10 mm backpiece and a 14 mm headpiece, with no other protection. In addition to leakproof tanks in the later versions of the Tony, some carry protection on the oil and coolant radiators.

Returned pilots report that the defensive tactics employed by the Tony are very effective. Seldom is a good target presented. The principal evasive measures taken by the Tony are either to half roll and go straight down, or, in the case of a deflection shot, to turn in and under our planes. In the opinion of these pilots, the Tony is the best all-around Jap fighter plane.

The Nick is a twin-engine two-place tandem day and night fighter with a radial air cooled engine and a three bladed propeller. Its top speed is approximately 345 mph at 21,000 feet, about 50 mph slower than the P-38G at that altitude.

The best characteristic of the Nick is its heavy firepower. Here the Japs have really departed from their former ideas and added a 37 mm cannon in the nose. The Nick also carries a 20 mm cannon in a bulge underneath the right side of the fuselage and a 7.9 mm flexible machine gun in the rear cockpit. The 37 mm cannon operates on recoil and moves rearward approximately one foot. A heavy compression spring around the barrel and a hydraulic cylinder absorb the recoil. The magazine holds approximately 20 rounds and cannot be refilled while the plane is in flight. Its effective range is about 300 yards.

The early edition of the Nick protected the pilot with a quarter inch thick armor plate backpiece and a three-eighths inch thick headpiece. Later versions added a 10 mm plate under the seat and a 12.5 section around the cannon in front of the pilot. The rear gunner, however, is protected only by insurance.

Combat reports indicate that the Nick is duck soup as a day fighter despite its heavy firepower. It is the least maneuverable of the three Jap Army planes and, without that advantage, its fixed firepower becomes less effective. Above 5,000 feet, its rate of climb starts to fall off rapidly and its speed, at any altitude, cannot begin to match our fighters.

One strange feature of the Nick is the fact that the rear gunner fires both the 20 mm cannon situated underneath the right side of the fuselage, and the flexible gun. It is obvious what a coordinated attack upon his position will do to his general status of well being.

Experts who are acquainted with Japanese aircraft are faced with a paradox that has not been answered satisfactorily. The Jap Navy's Zeke 52, a later plane than any of the three Army types, does not carry armor plate or leak proof tanks. The Oscar Mark 2, Nick, and Tony, completed before the Zeke 52, have those essentials.

There are two possible answers to this riddle. One is the fact that there seems to be a serious lack of coordination between the Jap Army and the Jap Navy. Second, the Japs have not been able to make important changes in their planes after they get them into mass production.

In summation, the three Jap planes noted here have a few excellent characteristics and many serious disadvantages. The Jap is improving, witness the new 400 mph Frank I, but he has not yet been able to match our aircraft. ☆

PICTURE CREDITS

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AIR STRATEGY IN LUZON

(Continued from Page 10)

any enemy activity that chanced to meet the eyes of our recon pilots. More than 1,800 sorties were flown against bridges, roads, buildings, shipping and factories.

In the record was a request from one of our ground commanders that planes cease destroying locomotives and rolling stock before our own extended supply lines suffered for lack of salvaged enemy railway equipment. Another ground commander had wondered jokingly why our planes couldn't "just blast the center spans out of bridges without blowing up the revetments 100 yards away and ripping up 300 feet of good concrete highway."

For the period, our losses had been extremely low: 26 fighters and 38 bombers destroyed or missing.

The battle for the southern section of Manila had entered its tragic stage of bloody, building-to-building, floor-to-floor fighting and wanton destruction by disorganized, fanatical Jap troops. Most of the larger buildings had been used as enemy arsenals, and when the stubborn defenders were driven from one after another they set off charges that laid waste blocks at a time.

One Allied demolition expert, who had served in the Mediterranean theater, said the explosions that rocked Manila were never equalled in Italy, not even at Cassino.

While our forces from the north pushed across the Pasig River, other troops entered Manila from the south after a successful landing on West Batangas and an airborne operation on Tagaytay Ridge.

Manila finally fell on March 2. By the time the city was securely in our hands, the Japs on Luzon were left without any capability for offensive operations. But the enemy commanders were quick to make the most of defensive delay by withdrawing all forces to the rugged terrain east of Manila, to Batangas south of Laguna De Bay, and to the mountains guarding the approaches to the Cagayan Valley in north Luzon.

This enemy defense has called for the closest air-ground coordination. Our bomb-carrying fighters have gone in time and again only a few yards ahead of our ground troops to blast the Japs out of caves and natural barriers.

The commanding general of one division reported he had "never seen such air cooperation, and up to this time I did not think it possible." Another commented that "our troops have entered areas standing up and smiling."

On March 16, when the battle for Luzon had settled into a stage of slow progress against final desperate defense, Gen. Walter Krueger told General Whitehead that the cooperation of air units with the 6th Army "is superb and is assisting materially in the taking of our objectives and in holding our own battle casualties to a minimum."

As in Europe, air power in the Philippines had many times proved its indispensability.

Without it, the Jap on Luzon was lost; with it, Allied forces pressed on toward final victory in the Far East. ☆

BENEATH THE RUBBLE OF SCHWEINFURT

(Continued from Page 6)

through the mountains of shattered masonry and twisted steel of the giant Kugelfischer plant. These were the remains of the largest ball bearing factory in Germany. A few streets distant we could see the bomb-pocked buildings of Fichtel and Sachs whose ball bearing shops were part of the Vereinigte Kugellager Fabriken (VKF) plant. Kugelfischer and VKF between them accounted for most of the ball bearings turned out in Schweinfurt. Altogether, the town had shuddered under the impact of 16 bombings, during which American aircraft dropped more than 6,500 tons. In addition, the RAF had paid two visits with sizeable forces, but we were particularly interested in the effectiveness of the first two American assaults and wanted to know if the damage done had justified the cost in bombers and men.

One of the first persons we talked with was a factory manager at Kugelfischer. He admitted the first two attacks caused considerable destruction and that production slumped appreciably for several weeks. He was evasive, however, when pressed for an exact assessment of the loss in output. Apparently he still had faint hopes that the Wehrmacht could pull victory out of the fire, for he even tried to conceal the location of an underground wing of the factory while being interrogated by our military engineers. Workers and people living in the neighborhood of the factory were considerably more voluble. They told how the first assault caused consternation among Nazi officials who had been led to believe that Schweinfurt's location deep in Germany made it immune from air attack. The workers said no adequate shelters existed at the time of the first bombing, and the physical damage added to the fears of the laborers regarding future raids precipitated a major decline in output. Accurate appraisal of production losses must await study of the factories' ledgers and bills of lading, most of which were captured intact, but the best evidence available so far indicates that the initial attacks paralyzed the production of Schweinfurt's ball bearing industry.

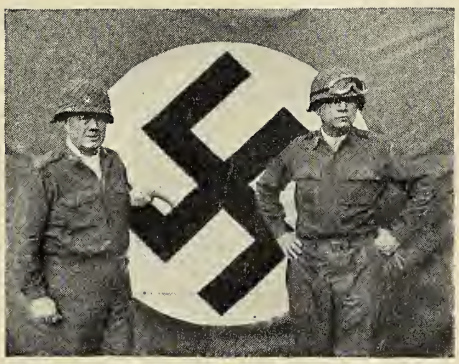
By the end of 1943, the damage at Schweinfurt had caused Germany's entire ball bearing manufacture to slump to about 70 percent of its former volume. In 1944, as the Schweinfurt campaign continued, the Germans desperately tried to protect their concentrated industry by moving part of it underground. Work was commenced on huge subterranean shops and shelters. Additional slave labor was imported to speed the project. These workers came from Russia, Italy, Poland, France and other regions, and for a time they apparently received reasonably decent treatment. Some of those who had been liberated with the capture of the town reported that the Germans fed them fairly well to keep them sufficiently strong for long hours of heavy labor. At Kugelfischer there was an elaborate plant below the surface of the ground protected by a concrete roof six feet thick. It was planned to move the entire works underground, but shortage of building materials forced abandonment of this scheme.

Meanwhile, Germany tried to bolster her diminishing ball bearing supplies by increasing imports from Sweden and Switzerland and by substituting flexible joints for ball and roller bearings. These efforts didn't help very much. Neutral shipments fell off to a thin trickle and the Nazis continued to rely on their battered Schweinfurt factories for their main source of supply.

By midsummer of 1944 the pinch was being felt. The shortage of bearings was reflected in the quality of some of Germany's tanks and aircraft engines. American aircraft were swarming over Germany seeking to paralyze the enemy's communications. By prodigious efforts the factories were continuing to make ball bearings but now the problem was how to get them out of Schweinfurt. Rail freight was a precarious method for no train was ever certain of reaching its destination. Highway transport was a slow and equally risky haul. This spring the situation became so acute that some of the Kugelfischer and VKF bearings were carted away in passenger automobiles and horse-drawn carriages. Scattered around the plants were hundreds of barrels filled with bearings of all sizes. They were crusted with rust for there had been no way of transporting them to where they were needed.

Even the most casual inspection indicates the air forces had done their work well in Schweinfurt. Their purpose was to disrupt a vital industry and they came close to doing it in a little more than a dozen tries.

One of the first acts of the 42nd Division infantrymen upon entering the town was to haul down the Nazi flag at Kugelfischer. Maj. Gen. Harry J. Collins, the division commander, turned it over to us to give to General Carl A. Spaatz, Commanding General, U. S. Strategic Air Forces in Europe.



Maj. Gen. H. J. Collins (right), CG, 42nd Inf. Div., and Brig. Gen. H. Linden with flag they presented to 8th AF group suffering heaviest loss on Schweinfurt missions.

Said General Collins: "I want this flag to go to the 8th Air Force group that suffered the biggest losses in the Schweinfurt campaign. The air has done a great job here and the Rainbow Division would like them to have this memento from the Infantry. I think we have avenged their losses." ☆

VICTORY IN EUROPE

(Continued from Page 7)

the officers' club at one of the oldest heavy groups in the ETO, the group S-2, a major with iron-gray hair and service stripes of World War I above this war's bars on his sleeve, tried to find the right words. He said: "I hope none of you guys will ever let anyone disparage the U. S. A. while you're around. Not even Americans. We all know we come from a good country, but most of us fail to realize how stupendous our achievements have been. Three years ago, militarily speaking, we had nothing. Today, with our Allies, we have smashed the deadliest menace—and the most powerful military machine — that the world had ever known. There it lies, rotting, in the stench of Dachau and Nordhausen and Buchenwald. . . ."

He hesitated, and a second lieutenant who looked about 19 said, "Go on, pop."

"There's enough glory in this victory for all the Allies," the major said. "Without the Battle of Britain, and without Stalingrad, we couldn't have brought our power to bear. But without us the British and the Russians could never have pulled the Nazis down. And when you think that in the same short time we've sunk the Jap Navy and put a hundred carriers in Hirohito's front yard, without even seriously dislocating our civilian economy, why then the power of the United States of America seems fantastic. It's not conceit to recognize the fact. It's our duty and our job to recognize it, and maintain it, and direct it toward the good of the world. For God's sake, let's not go home after we've finished the Japs and decide we can get along without the rest of the world. Even if we could, the rest of the world couldn't get along without us." He stopped suddenly and looked around sheepishly. "Hell," he said, "I'm sorry. I talk too much."

A tall flyer drained his glass thoughtfully. "It makes pretty good sense to me," he said.

That was one reaction, but such self-expression was rare. So were prolonged demonstrations or celebrations among AAF personnel. Generally speaking, the more recently operational an outfit had been—and the closer to the front — the less hilarity there was. Perhaps the men were too tired. Perhaps they had too much to remember. Perhaps they simply felt, as one soldier put it, that it was a good day for the civilians to celebrate.

The civilians did—in most of the capitals of Europe, in Paris and in London particularly. In Paris, just before three o'clock on Tuesday, the crowds began to swarm into the Place d'Opera. The news had been broken in French newspapers the day before, to the anguish of Allied correspondents still muzzled by SHAEF censorship. In front of the Opera the sun was bright on the flags of many nations. Jeeps crawled through the crowd literally smothered by people, moving mounds of men in uniform and girls in bright dresses and crazy hats. A truckload of German prisoners, smiling rather arrogantly, was booed by the crowd and the guards waved their guns. But the people were too happy to be a menace, unlike the crowd of the previous day that had watched in angry silence some prisoners munching American rations.

Girls threw their arms around perfect strangers and kissed them on both cheeks. GIs kissed girls, usually on the mouth. Nobody resisted very fiercely. The cafes were jammed, and people did funny little dances in the street.

A correspondent asked a 9th Air Force captain wearing two DFCs whether he thought so much gaiety was in order when men were still fighting and dying in the Pacific. "Good Lord, yes," said the captain. "If the Pacific War had ended with me trying to strafe some Jerry ammunition train, I'd have wanted those guys to have the best damn party on record. Some of my old gang are out there in the Pacific now. I bet when they're through with today's fighting they'll hoist one or two for me—if they have it to hoist."

In London, the city that had endured without flinching the Blitz, the buzz bombs, and the rockets, enthusiasm could not wait for the official announcement. By Sunday the city was decked with flags and pennants, the British colors contrasting oddly with the dingy unpainted window-sills and the skeletons of blitzed houses. It was as if a tired old lady had suddenly decided to put gay ribbons in her hair.

On Monday night the crowds swarmed down Piccadilly waving flags, and singing everything from *Tipperary* to *Old MacDonald Had a Farm*. They climbed lamp-posts and danced on the roofs of buses. The city was relatively dark that evening, but the next night—Tuesday—floodlights blazed around St. Paul's and Buckingham Palace. At the palace a vast crowd waited patiently to hear the king's speech. A couple of restless Mallards kept circling the palace, wings whirring, and once a C-47 went lumbering across the sky. When the royal family finally appeared on the scarlet-draped balcony, a roar went up like the sound of surf in a northeaster.

At that same moment the silence must have been deafening in the ruined streets of Kassel and Schweinfurt and Berlin.

From then until dawn the crowds milled through the streets of London. The only solemn people were the MPs, wistfully dignified in all the bedlam. There were flaming torches along St. James, and the girls with paper hats captioned laconically, "Adolf, you've had it."

Vendors sold flags and tri-colored rosettes. Even the dogs wore red-white-and-blue ribbons in their collars.

London was colorful that night. She welcomed, as best she could, the American airmen who had helped bring her the victory. The Red Cross clubs would accept no money for food or drink that night: everything was on the house. AAF men who were lucky enough to be there will never forget it.

But they, after all, were only a handful out of nearly half a million men scattered over Europe, all members of the same AAF team. In the prison camp at Moosburg, Germany, there still were American flyers waiting to be transported home, men who had been shot down over Paris, over Brunswick, over the flaming refineries of Ploesti, of Bohlen, of Magdeburg. For them the war ended the day American tanks poked their armored noses through the barbed wire that had held them captive. In the hospitals, too, were airmen scarred by flak or frostbite, some still bed patients, some ambulatory in their red army bathrobes. For them the war had ended the day they were hurt. For them the next great day would be when they came home.

All of which is another way of saying that it's impossible to generalize about the impact of V-E Day upon individuals. It's true, for example, that the pubs and cafes and bistros of Europe were full of uniforms, but so were Notre Dame and St. Peter's and St. Paul's. It's true that the ending of war in Europe left some of the participants curiously unmoved, but to others it was a profoundly emotional experience.

We were sitting in the snack bar of a Red Cross club in London in the small hours of V-E night, drinking coffee by this time. We had been talking about the war in the Pacific and how long it might last. Some said they'd just as soon go on out there and some said they'd rather not and most of us agreed we'd end up there in any case. ☆

Rendezvous

(Continued from Page 60)

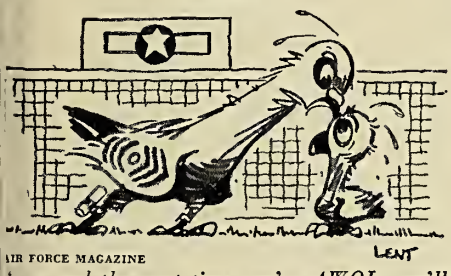
hard time hearing my telephone. It also makes my bedsprings squeak and the radiators get noisy. But that's not the worst of it. The radar rays are killing all the fir trees around the house. I have been patient about this but I can't stand it any longer and so if you don't do something to relieve the situation I'm going to write my congressman to investigate. I might add that it's not the fast planes that bother me—it's the slow ones. The slow ones kill my trees much faster."

I hang up the telephone and wonder where our civilization and magic things like radar are leading us. But we can't talk about radar, I say to myself, so I call the Navy and tell 'em it's their pigeon because Navy planes fly over this lady's trees.

Maj. Erwin G. Morrison, Hq. 4th AF

☆

HOMER



AIR FORCE MAGAZINE LENT

". . . and the next time you're AWOL, you'll go in to the old man on a slab of toast!"

Answers to Quiz on Page 46

1. (B) FW190-JU88
2. (D) Snatch
3. (C) $600,000
4. (B) S-2
5. (D) $500
6. (B) Was the target of air-sea bombing experiment
7. (C) Quotient of a plane's true airspeed divided by the speed of sound
8. (D) Surveying or mapping by aerial photography
9. (C) Proving Ground Command
10. (4) Jul-Oct
11. (D) A German jet-propelled aircraft
12. (A) 15 minutes
13. (C) Advance echelon
14. (D) An aircraft with flapping wings
15. (C) Saipan
16. (D) Contraction of jadgbomber, German for fighter-bomber
17. True
18. (C) As "Z" indicates Greenwich time, it would be 9:01 at Birmingham which is in Central Time Zone
19. (C) 14th Air Force
20. P-61

FROM DUSK TO DAWN

(Continued from Page 13)

The distant rumbling of artillery told him he was still close to the lines. After 10 hours he reached a town, which, except for two houses whose chimneys were smoking, seemed deserted.

Cautiously, he made his way to one of the houses. Peering through the window he saw two American soldiers seated at a table drinking coffee. When he entered, the soldiers were ready to shoot him on the spot. It took some fast talking to convince them that he wasn't a German in American uniform.

Bielinski, who bailed out immediately after Stipick, also walked cross-country in a westerly direction. Finally after he had hiked for hours, a challenging American voice rang out: "Halt! Who's there?"

"American pilot!" Bielinski shouted back.

"Advance, pilot, and be recognized."

Bielinski stepped forward and found himself looking down the barrel of an M1 held by a determined-looking sentry.

"What's the password?" the sentry demanded.

"Don't know it," the pilot confessed.

The sentry took a firmer grip on his rifle.

"What outfit you from?"

"155th Photo-Reconnaissance Squadron."

"Never heard of it," the sentry said. "Stand where you are or I'll plug you."

There was some more palaver and the sentry finally marched him to a nearby command post where an infantry captain asked Bielinski to produce his AGO pass.

"I never carry one in an airplane."

"How about dog tags?"

The pilot handed them over, but the captain still wasn't satisfied.

Fortunately, Bielinski was rescued a few hours later by an Air Forces lieutenant who happened to be visiting the area. It turned out that the lieutenant had graduated from the same flying school.

Enemy night fighters present another hazard. As a rule, the A-20s can dodge them by evasive tactics, particularly if there is no moon. Occasionally, however, the fighters can cause a lot of trouble. One photo plane came back with 45 bullet holes in its fuselage after a brush with the interceptors.

On another night, Bielinski was chased from his target by several ME210s. As he ran for home, the voice of the ground controller came through his ear phones imploringly: "Can't you go any faster? Six of them are closing in on you."

Bielinski poured on the fuel, and barely set the wheels down on his runway ahead of the pursuing fighters.

There are other incidents such as the one that netted Aerial Gunner Jack Holden the Purple Heart for a pair of broken ankles. Holden was in the turret one night when his plane was surprised by an enemy interceptor. The pilot threw the Havoc into a steep dive from 8,000 feet. He didn't pull out until the plane was just above the tree-tops, and the A-20 levelled off with such an excess of Gs that the gunner's ankles snapped like matchsticks.

Then there was the time that 1st Lt. Robert L. Anderson was coming across Chalons. Suddenly his navigator warned him that tracers were arching over the plane. Anderson put his plane into violent evasive tactics, but wherever he twisted and turned tracers continued to criss-cross his path. Eventually, he managed to escape. When he landed, he was convinced the Luftwaffe's entire night fighting force had tried to bring him down. It developed, however, that he had flown directly over an exploding ammunition dump.

Colonel Philbrick says that a night-photographic outfit's prime targets are enemy movements and activities, and that its operators should supplement rather than encroach upon those of a day-reconnaissance squadron. The Colonel believes that night photography of fixed defenses is justified only in relatively rare situations. Normally, he says, our daylight reconnaissance tells us what the enemy has; night reconnaissance tells us what he is trying to do with it under cover of darkness.

The A-20s of the 155th are adapted for both the high-voltage flash and the M46 photo-flash bomb. The high voltage flash, developed by Dr. Harold Edgerton, is a means of illumination that is fixed to the airplane. It is used only when pictures are taken from low altitudes. One of its advantages is that the negative does not pick up any shadows, thus making it ideal for photographing wooded areas.

The photo-flash bomb, which emits an 800,000,000-candlepower light, is used for higher altitudes. The flash of the exploding bomb activates a photo-electric cell which trips the shutters of the K19B cameras.

Some of the early missions showed that the flash bombs were exploding too far behind the airplane to give the cameras sufficient light. 1st Lt. John Keane, of Dobbs Ferry, N. Y., solved this problem by refashioning the angle-trail plate of the bomb, thereby causing the bomb to fall at a reduced trajectory.

Capt. Joseph F. Condon, of Philadelphia, one of the photographic officers, suggested the installation of two cameras in each plane, one focused 14° to starboard, the other 14° to port. Experiments proved that this method permitted the photographing of a considerably wider area, thus compensating for slight errors in navigation over a small target.

Early experience also showed that the maximum light of the photo bombs was reaching the cameras after their shutters closed. To remedy this, Colonel Philbrick assisted in designing a device that delayed the action of the cell to insure the cameras' receiving the peak light of the bombs.

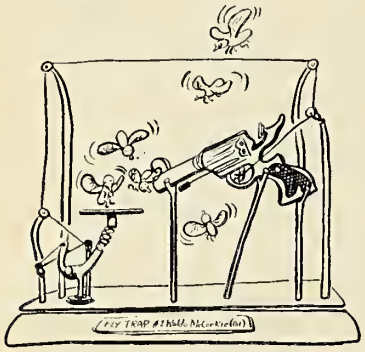
According to the Colonel, final perfection of the art of night photography still necessitates long-range experimentation extending over many months.

"This experimentation should not be tackled in a theater of operations," he says, "but referred to proper development agencies in the United States. ☆

SHOOTING THE BREEZE

GOT ANY GOOD STORIES? SEND 'EM IN!

Marianas. 2nd Lt. Waldo McCorkle was doing his bit as an A-3 officer when one day he went a little daft. McCorkle estimated that he had filled out 10,000 reports—more than anyone could possibly read. Ahead he saw nothing but more reports, so he decided to make a test to see if his reports were ever read. With a strange light in his blue eyes, McCorkle drew up a floor plan of the local enlisted men's mess hall and drew three small circles which he labeled Fly Trap No. 1, Fly Trap No. 2, and Fly Trap No. 3. Space on the report was provided for this information: Total flies caught from .... to ..., Flies previously reported ..., and Total flies to date ..... The lieutenant then mimeographed this form. He filled in the spaces and placed this form on the top of his stack of official reports. This batch was sent along, through channels, fly figures and all.



Several months went by and then it happened. An officer of another outfit on the post called McCorkle on the telephone. "What is all this fly report about?" he asked, his voice showing deep concern. "Our CO just got word from Washington wanting to know why we aren't on the ball. We must have lost the directive on that fly report. Can you give us a little help?"

McCorkle's own CO was roundly congratulated for having such alert officers.

USA. It happened at the Aircraft Mechanics School at Lowry Field, Colo. A student engineer was up for his first flight. The lad was sitting in the copilot's seat, anxiously watching everything, and nothing in particular. Suddenly the pilot said, "Feather three." Eager to please, the student engineer asked, "Which three?" Rumor has it that the young man is now doing well in the ground forces.

England. The officer in the control tower answered every requirement of a smart aleck. He was fast on the tongue and no pilot, on or off the air, had ever been able to top him. One airman, however, decided to catch the wiseacre off guard.

While flying in the vicinity one day, the pilot called the tower, "This is X-X670 OK at 40,000 feet. Give me instructions for landing."

Without a moment's hesitation the character in the tower snapped back: "Shoot off another rocket, Buck Rogers, then go around again. You're number six in the pattern."

CBI. The old saying that only one shell or bullet has your name on it was disproved in the case of Lt. Randy Owen of the First Air Commando Group recently. While flying a particularly hazardous mission over Jap-held Burma, Lieutenant Owen's P-47 suffered quite a few bullet holes and was even hit by a 20 mm shell which lodged in the wing and failed to explode. After returning to his base, his ground crew proceeded to repair the damage and extract the unexploded 20 mm shell from the wing. After this delicate job was accomplished, Lieutenant Owen was amazed to find in English the initials R. O. neatly stamped on the shell casing.

Burma. Cpl. Jonas Harschel who served with the 679th Signal Warning Squadron in the Naga Hills had a way about him with native head hunters. At first the squadron approached villages with extreme caution, reminding stragglers that they were in danger of being sautéed. On these occasions, when the suspicious, well-armed natives came out to meet the signalmen, Corporal Harschel broke out his portable phonograph, cranked it, then put on a record which proved its worth many times, Gene Krupa's "Jungle Madness."

"Those savages know a real drummer when they hear one," Harschel explained. "The tom-tom seems to send 'em."

Philippines. This episode has little significance beyond the fact that it is reported by one of our staff correspondents who happened to be on hand, he claims, when the incident occurred.

An LST which had been en route several weeks was nearing the action zone for the invasion of Leyte. The usual crap game was in progress below decks and the Officer of the Day, realizing that the troops would have to be alerted soon, ordered one of the guards to go down and break up the game.

Some 30 minutes later, with sounds of the game still evident, the OD made a personal investigation. He found his guard, bills entwined in the fingers of his left hand, preparing to roll the dice with his right.

"I thought I told you to break up this game," the officer said.

"I'm doing the best I can, sir," the guard replied. "But I only had a buck to start with."

Italy. Sgt. Joe Hegdahl, former member of the Minneapolis Fire Department, took great pride in his civilian profession and often told of his experiences with smoke and flame. Then, one day, Sergeant Hegdahl returned from work on the line to find his own tent ablaze. The sergeant, in a lapse of attention, had hung a freshly washed shirt over a ten-gallon oil drum stove, hoping to find it dry when he returned. Instead, he found it had burned and ignited his tent. Amazed and a little chagrined, the sergeant dashed inside to salvage his girl's picture. Beating his way through the flames, Hegdahl grabbed what he thought was the photograph and escaped unburned. As the tent collapsed behind him the sergeant discovered one more error. He had not rescued his girl's portrait—but a copy of the National Fire-Fighters Weekly. ☆

The Album — EARLY ENGINES

1910. We are told that the mustache and pipe at left belong to J. F. Cooley, who is shown backed up by a Cooley airplane. The young buck at right is holding up or being held up by a 2-cycle 60 hp Elbridge engine.

1916. Mr. J. Newton, who appears to have donned his thinking cap for the occasion, speaks a few kind words over a recalcitrant engine which he and his playmate hoped would start these helicopter blades whizzing.

1914. Grease monkeys of the 1st Army Aero Repair Shop at San Diego are shown at work on some new-fangled engines.

. . . there's still
a lot
of fighting
ahead . .

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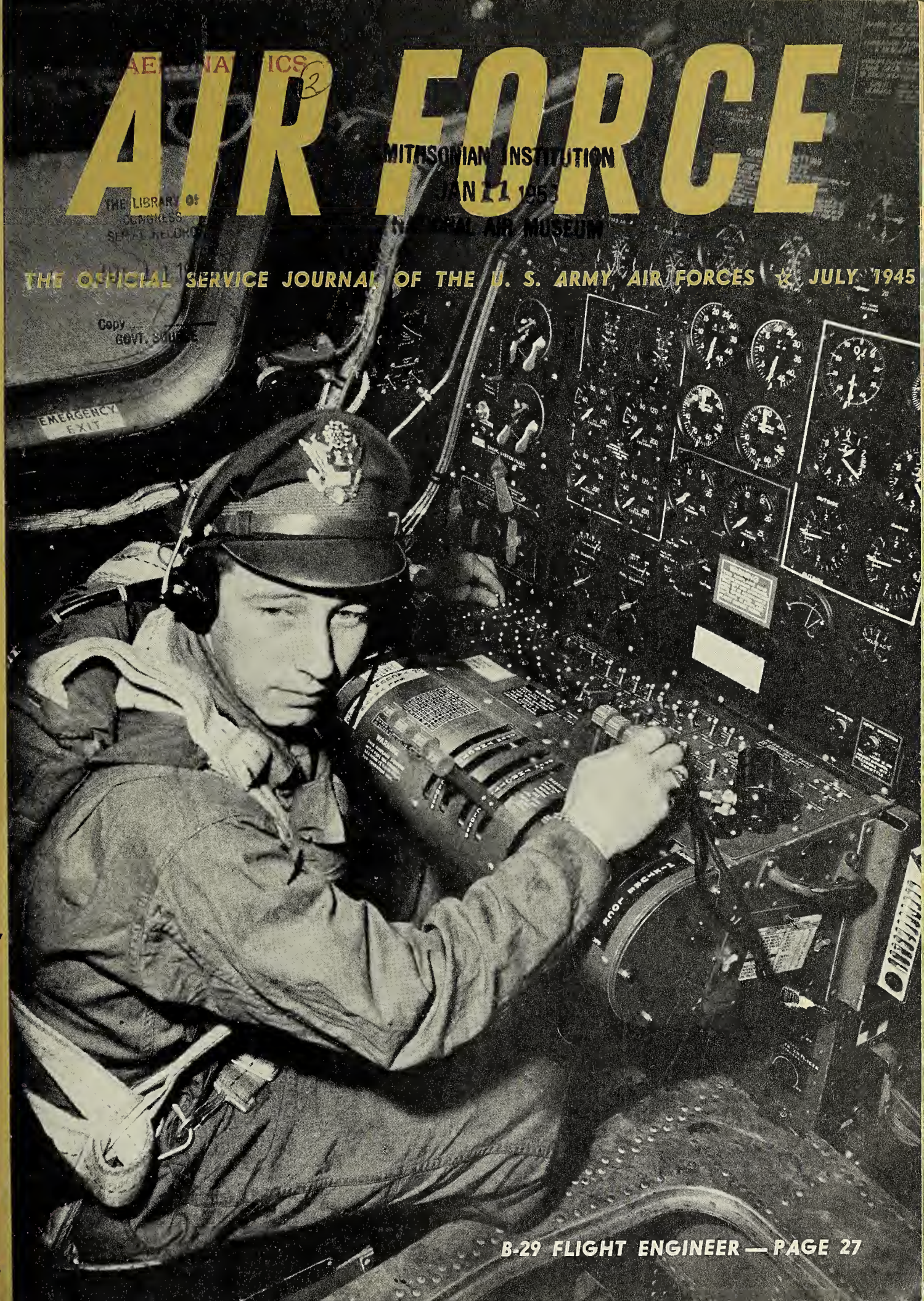

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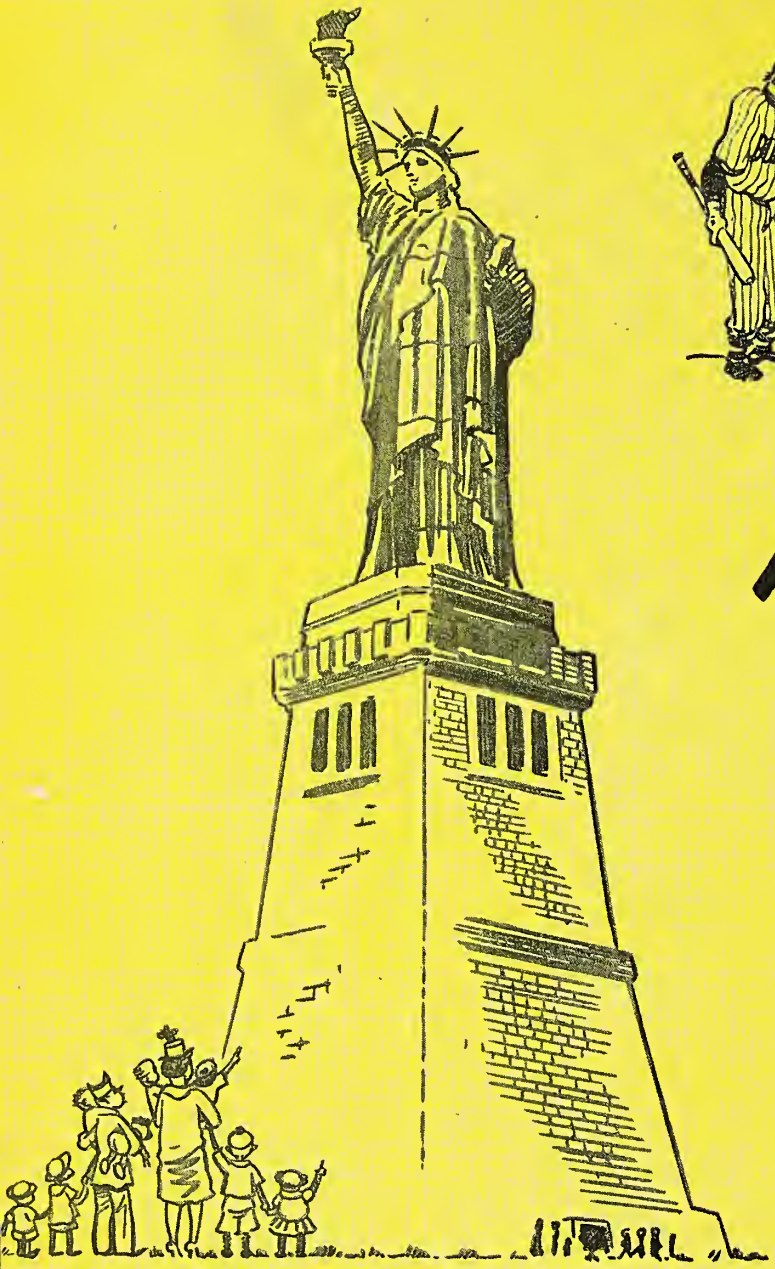


"I never really knew what it meant till I went overseas."

"Jiggers, men. The autograph gang is here

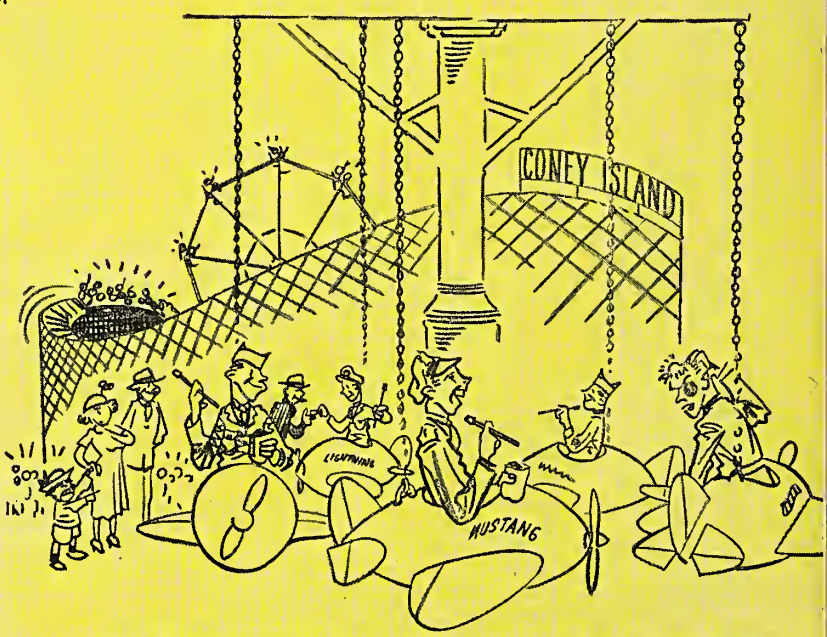
New York Furlough

by CAPT. WM. T. LENT

AIR FORCE Staff

"It ain't the altitude that gets me. It's the rate of climb."

"What d'ya hear from the ATC gang back in Accra?"



"Aw, make someone else play the German fighter this time!"

Rendezvous

Cheese Sandwiches

Dear Editor:

The B-29 has been described (and publicized) as the aerial counterpart of the battleship, what with fire control, remote gun positions, etc.

Why not carry the comparison a bit further and designate a damage control party for the B-29. It seems that a number of reinforced rubber patches could be added as equipment and used to stop up bullet holes, and thereby keep up cabin pressure. Internal pressure would keep them in place.

Sgt. Erwin Werthamer,
Section F, Pyote, Texas

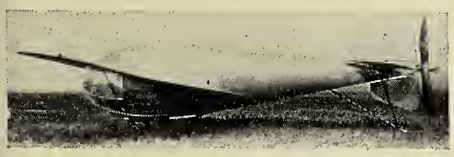
Use of patches to stop up bullet holes and retain pressurization in B-29s has had past consideration by ATSC. Actual results of combat missions have shown, however, that improvised patches have worked extremely well and therefore standardization of any specific patch material has been temporarily dropped.

Cheese sandwiches, flying boots, jackets and seat cushions have been used satisfactorily to plug up holes in the fuselage. In one case a B-29 "tanker," had a six-inch hole plugged up with a seat cushion in one of its blisters, made two round trip flights over the Hump with a normal pressurized cabin.—Ed.

The "Bullet"

Dear Editor:

The picture of the Gallaudet "Bullet" which you were kind enough to obtain arrived. It might interest you to know



that this plane actually flew, although it could not have been called an unadulterated success. It had a very marked tendency to "porpoise" and after a few hundred yards, with its 100-horsepower Gnome spewing castor oil, it dove into the ground from a height of about 200 feet. Attesting the value of the metal frame, my uncle, Mr. Gallaudet, was able to crawl out and walk away under his own power although the crash left him with injuries which have come back to haunt him since he was in his late sixties.

John W. Edgerton,
New York.

"Who Dat"

Dear Editor:

Without taking any credit from the fine record of the ATC in Africa, it is only fair to point out that your April article, "Airline Across Africa," omits mention of the work done by personnel of the Air Technical Service Command. Before the ATC as such was organized in this wing, now divi-

(Continued on Page 2)

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THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

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Rendezvous

(Continued from Page 1)

sion, the 8th Air Depot Group of the ATSC was working at Accra and other stations in the division.

S/Sgt. Norman C. McKenna,
Editor, WHO DAT,*
8th Air Depot Group Newspaper.

* Founded November 25, 1942, the oldest continuously published daily in Africa.

Credit should be given to the 8th Air Depot Group of what was then known as ASC. This organization did a very good job in moving supplies up to front line units, long before ATC took over such responsibilities.—Ed.

A Boner

Dear Editor:

While reading the "Boners" column of the April issue of AIR FORCE Magazine, I discovered that AIR FORCE had made a very large boner itself.

Commenting on the evident carelessness of a B-17F pilot who, by mistake, raised the landing gear while taxiing, the author said "This is the type of man who would drop his bombs without opening the bomb-bay doors."

There are two reasons why this is not possible. First, the bomb-bay door safety switch, which prevents electrical release by keeping the electrical circuit open until the bomb-bay doors are nearly open. I'm not sure about the distance, but I believe it's one-quarter of an inch.

Second, on the bombardier's compartment, on the bomb-bay door handle, there is a metal projection which prevents the bomb release handle from being moved to the rear unless it (the projection) is moved to the rear first. This prevents salvo, or mechanical release of the bombs unless the doors are open.

Am I right, or have I "stuck out my neck?"

Yours for a bigger and better AIR FORCE.

Cpl. D. E. Webb,
Class 225, L.V.A.A.F.,
Las Vegas, Nev.

You are right. Our attempt at humor evidently misfired.—Ed.

Overseas Shoulder Patch

Dear Editor:

In the AAF Quiz, April 1945 issue, Question 6 concerns the wearing of the shoulder sleeve insignia of overseas commands by personnel who have returned to this country. The answer given by your quiz editor is that this is not permitted. In my job as Ass't to the AAFPDC Hospital Liaison Officer here at Camp Kilmer, I must pass this type of information on to newly-returned men. Recently, however, the Daily Information Sheet published here contained a paragraph contradicting this answer.

Could it be that your Quiz Kid has slipped? I hope so, for I've already made several changes on my own uniforms in accordance with the above mentioned paragraph.

S/Sgt. Thomas J. Siddons,
AAFPDC Hospital Liaison Office
Camp Kilmer Station Hospital

When the April issue went to press, the answer given in the Quiz was correct. Since then, however, the regulation pertaining to wearing of shoulder sleeve insignia has been amended. See Questions on Policy and Procedure, *Page 37.—Ed.*

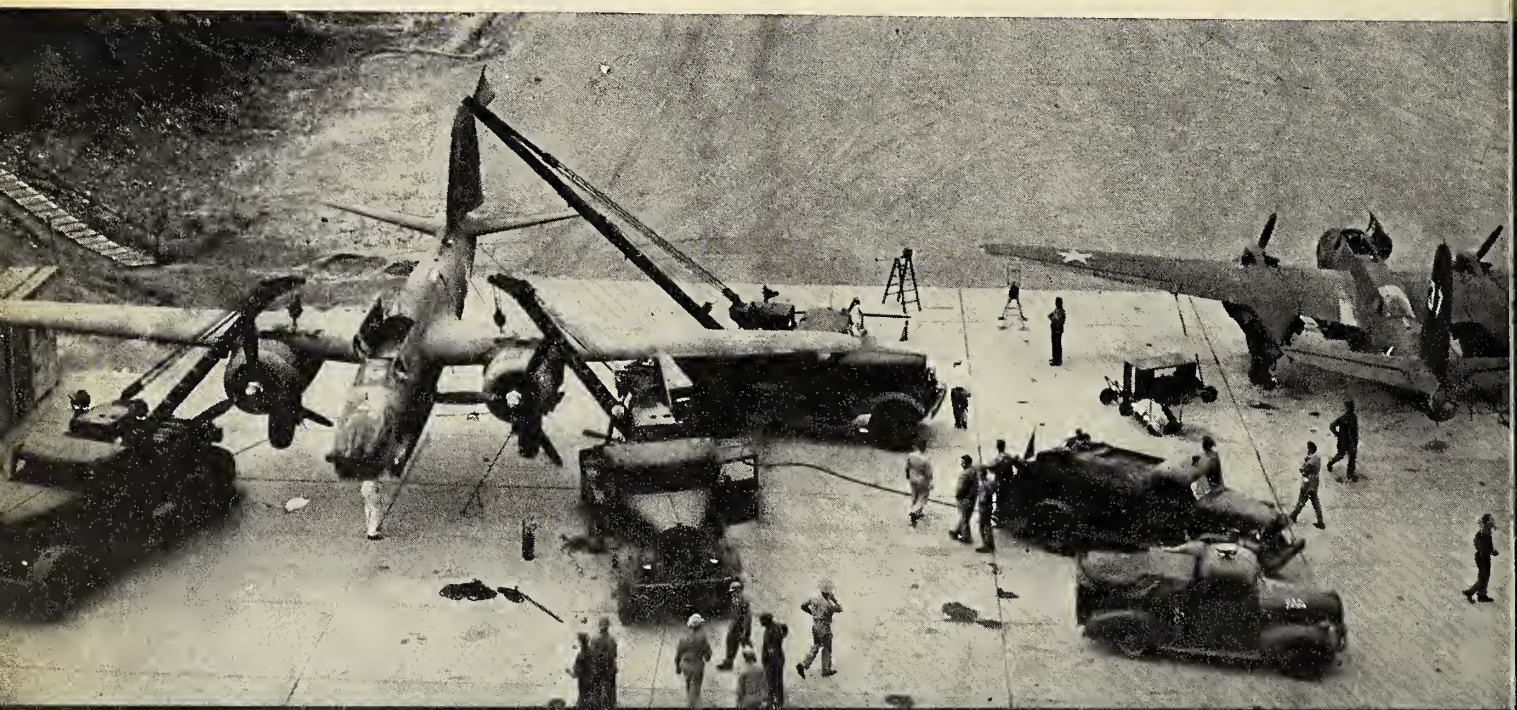
From the Seabees

Dear Editor:

I know that it is unusual for a Seabee to write to your magazine, but we are having quite an argument here on the subject of whether the nosewheel of a Douglas C-54 is controllable from the pilot's compartment, and does he use it while taxiing the plane? Or does he just use his brakes? Also the P-38 came up in the same discussion, but we don't have any bets on it. Our outfit is doing the field maintenance work here, but none of these planes (C-54s) ever come in and therefore we would appreciate your answer on this matter.

Robert E. Boardman, M.M. 3/c H-19,
N.C.B.M.U. 432 c/o F.P.O.,
San Francisco, Calif.

The C-54 has a steerable nosewheel, but no nosewheel brake. A six-inch hand wheel



How Sharp are YOU?

Here's a busy scene snapped on the armament range at Wright Field. There's a lot going on so you better take a full 60 seconds' worth of concentration on this photo before you turn to Page 43 to tackle the 10 questions you'll find there. Score 10 for each question. 60 is average, 70 is good, 80 is superior, 90 is excellent, 100 is unbelievable.

HOW SHARP ARE YOU? _____ Turn to Page 43

on the pilot's left is used to control the nosewheel. The nosewheel on a P-38 is not steerable. None of the tricycle gear airplanes has brakes on the nosewheels.—Ed.

Chamber of Commerce

Dear Editor:

Attention is invited to Page 49 of April 1945: Tech Topics—a huge climatic hangar.

Hate to see AIR FORCE make a "Type" error. The Watertown you mention is in the state of South Dakota—not North Dakota.

Got to put a plug in for the old hometown—don't 'cha know.

Cpl. John J. Bacon,
Wright Field, Ohio

You're right, we're wrong.—Ed.

From Down Under

Dear Editor:

Thought you might be interested to hear from a New Zealander in your magazine. Without a doubt I'd say it's the best service or commercial publication hitting N. Z. Have just finished reading your Jan. '45 issue from cover to cover, and was very grateful for the excellent "gen" in "Prepare to Bail Out."

At present I am doing Primary Flying Training and it's articles such as this that are most useful to know about from the start. Also thanks on behalf of all of us for your praises of the RNZAF in a former issue.

Beeause we use U. S. made equipment, your technical information is very useful.

Here's hoping you the best, and keep up the good work.

LAC Dobbs, P. J.
RNZAF

Our Mistake

Dear Editor:

The article of "Cracking Ice" by S/Sgt. Douglas J. Ingells in the April issue of AIR FORCE Magazine I believe is possibly in error in that the most dangerous temperature zone for icing is 0° C and —18° C instead of F; with the most serious icing conditions occurring around —7° C instead of —70° F as reported.

Temperature of —70° F is encountered only near the tropopause (in equatorial zones) where the moisture content of the atmosphere is extremely low.

I found S/Sgt. Ingells' article to be very interesting and containing many good thoughts.

S/Sgt. Joseph E. Ehrlich,
Base Weather Station,
Kirtland Field,
Albuquerque, N. M.

Conversions from Centigrade to Fahrenheit were incorrect. The article should have stated that the most dangerous temperature zone for icing is between zero-degrees Centigrade and minus 10°C., with the most serious icing occurring around —4°C. In Fahrenheit, the range would be from 32° to 14°, with the most serious icing occurring at approximately 24.8°F.—Ed. ☆

In This Issue

This month's cover features Lt. Henry O. Hagen, flight engineer on a B-29. (The training of the flight engineer and the part he plays on Superfort combat missions are discussed in the article, "B-29 Flight Engineer," on Page 27). Lieutenant Hagen started his air force career in the AAF Technical School at Love Field in April, 1941. He was graduated and assigned to Luke Field Army Air Base where he was a mechanic on P-40s and P-38s, gradually working his way up to line chief. In May of 1943, Lieutenant Hagen was accepted for flight training and subsequently received preflight training at San Antonio, primary at Bonham, Texas, basic at Greenville, Texas, advanced at Ellington Field, Houston. He was then sent to B-29 flight engineer school at Amarillo, Texas, and after completing the six weeks' course there, he went to Lowry Field, Colo., where he took a ten weeks' course. Recently, he was assigned to his permanent B-29 crew which is now in training at Smoky Hill Army Air Field, Salina, Kan., as part of a Superfort group being readied for action in the Pacific. Lieutenant Hagen, who is 25 years old, is married and has a little girl, 15 months old. The photo was taken by M/Sgt. R. H. Haley of the Smoky Hill Base Photo Lab.

☆

Establishment of a Far East Edition of AIR FORCE will be of special interest to the thousands of AAF readers who will presently be deployed to Pacific areas. Late in May the first edition (June issue) came off the presses of Carmello and Bauermann, Inc., 2057 Azcarraga St., Manila. The printing of a Far East edition and maintaining an office in Manila means 1: that we will be able to give more complete coverage to AAF activities in the Pacific; 2: that each issue will be in the hands of Pacific readers within days instead of months after coming off the press. Pioneers in setting up the Far East AIR FORCE were Maj. John Jenks, in charge of AIR FORCE production, and Maj. Tom Hardman, of AIR FORCE editorial staff. They arrived in Manila while it was still smouldering ruins and under shell fire. It was while stumbling through the rubble that they located the only printing facilities that had survived the Battle of Manila sufficiently intact to do a big time printing job. Immediate arrangements were made, with the cooperation of OWI, to secure press time for AIR FORCE. The Far East edition of AIR FORCE, for the time being at least, will be essentially the same as the domestic edition. In fact, the Manila job is printed from duplicate plastic plates that are shipped by air from New York to Manila. At present, distribution is confined to units of the Far East Air Forces of General Kenney. As transport facilities become available, however, it may be that distribution of the Manila edition will be extended to include AAF personnel in all Pacific areas. The Far East Edition of AIR FORCE, like the domestic edition, is under the direction of Lt. Col. James H. Straubel, who is at present on a tour of duty in Manila.

☆

While on the subject of branch offices, there is Maj. Robert V. Guelich, whose article, "Silent Partner of U. S. Airpower," appears on Page 28, who has been in charge of our Wright Field office since May, 1943, except for a tour of duty as correspondent in the CBI. Bob Guelich is familiar to AIR FORCE readers for his many articles on technical and semi-technical subjects. At present he is working on a compressibility article, hoping to qualify for the Order of Compressibility Experts. Membership in this informal organization is achieved by "having completed an arduous course of study in compressibility phenomena, having thereby confused, constricted and machtified any thinking faculties as to be now rendered wholly worthless for any useful pursuit." A full fledged member is entitled "to pass confident judgment on matters of which he knows nothing."

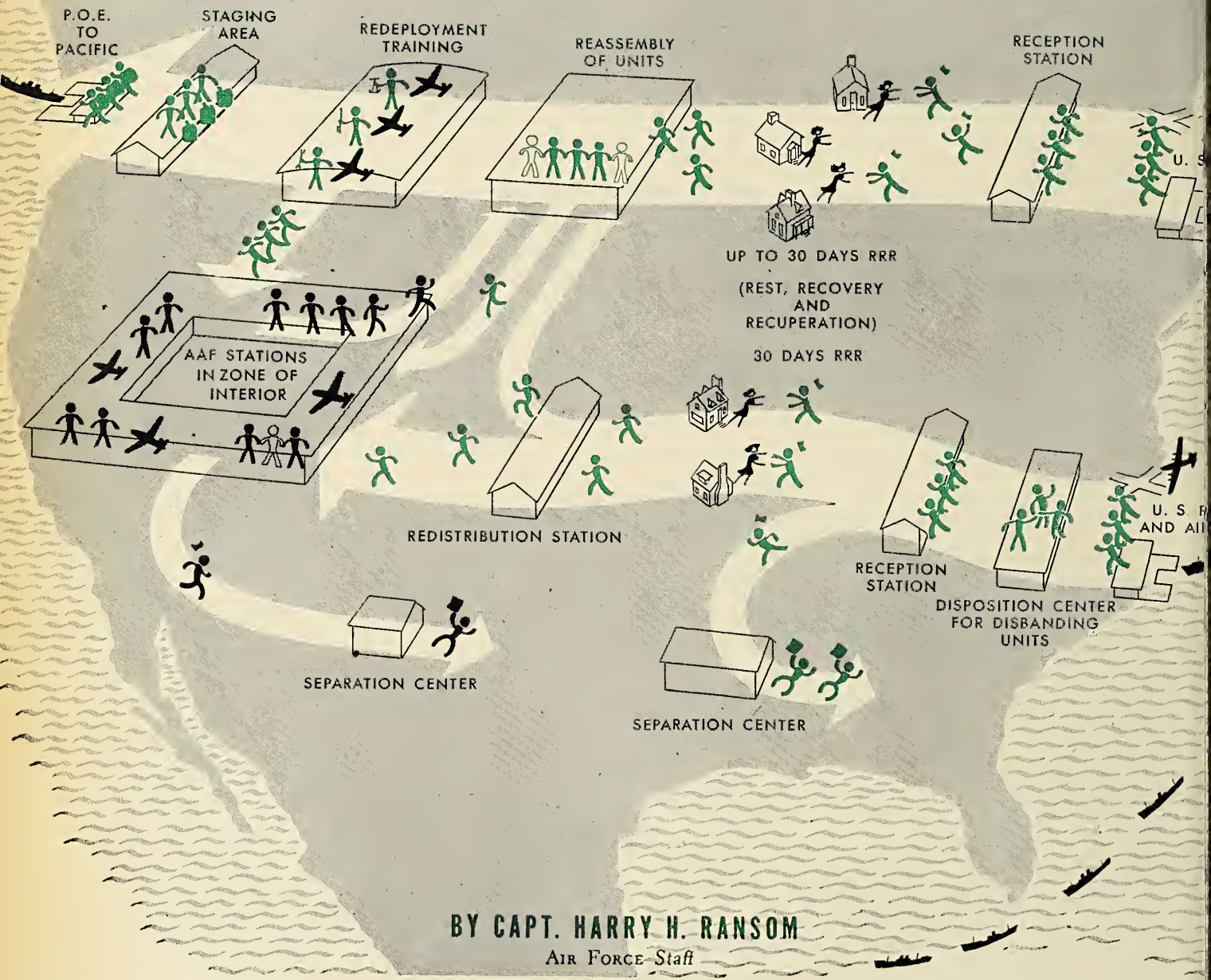
☆

For our two correspondents in Europe, there has been no letdown since V-E Day. Maj. Arthur Gordon, who took time out to do the "Victory in Europe" article last month, is back hard at work on his special assignment of gathering material for a comprehensive analytical appraisal of the AAF's role in the aerial smashing of the Nazis. The results of his survey will appear as a special supplement in a future issue of AIR FORCE. To keep our readers current of AAF events in Europe, Capt. Eric Friedheim is getting the lowdown on the Occupation Air Force. From the famous Munich beer cellar he sent us some hundred-million mark notes, with an apology because he was too late to get Hitler's signature for our Short Snorter.

☆

Back from France is our staff photographer, T/Sgt. Roger Coster (see "POW" Page 44), his formerly tight-fitting uniform draped around him in ample and loose folds. His first mission on arriving back in New York was to put away a big juicy steak. After two days he reported back that he hadn't been able to get close enough to a steak even to take a picture of one. And while on the subject of steaks, Capt. Larry Bachmann (see "Our 30,000-foot Periscopes," Page 7), fresh from the rigors of northern China, reported from Ceylon that he not only was served two-inch steaks, but his hosts were offended if he didn't accept second helpings! We can't understand why he seemed so anxious to get the first available air transportation for the Pacific. ☆

Redeployment in the AAF



BY CAPT. HARRY H. RANSOM
AIR FORCE Staff

The AAF is on the move. After a trans-Atlantic hop and a period of rest, heavy bombardment groups have already begun retraining in B-29s. Officers and men of Troop Carrier units, only a few hours removed from active duty in Europe, scatter to reception stations in the United States before going home to rest. From the Mediterranean area, service squadrons embark for islands in the Pacific, while supply squadrons in France pack for a trip through the Panama Canal to the Philippines. A few men who on May 12 had interim scores of 85 points or more on their Adjusted Service Rating cards are already in civilian clothes. Non-essential individuals who have the critical number of points are awaiting transfer to Separation Centers. Near posts which they will take up as units of the Occupation Air Force, AAF groups are scheduling furloughs, leaves and passes in Europe before settling down to their OAF jobs. Meanwhile, from the United States, individual replacements and redeployed units move steadily toward the Pacific and the Orient.

At first glance, this world-wide motion is too big to make sense. As the new avalanche of power against Japan gains speed, the conditions of military "readjustment" become clear. The purpose of this article is to discuss some of those conditions and to answer several specific questions as fully as military security and changing circumstances allow.

All the AAF's global changes are focused on the defeat of

Japan. Even before Germany finally surrendered, a part of the airpower once directed against the Reich began to turn against Nippon. This shift has enlarged the mammoth operations of supply, transportation, and reassignment implied by the AAF's share in the Pacific war.

Two simple principles help to clarify questions about redeployment in the AAF. The first is the clear purpose of all the armed forces to defeat Japan completely, quickly, and with as few casualties as possible. Second, and inseparable from this purpose, is the fact that military necessity must dictate every step of redeployment. Convenience does not enter into the plan, although the claims of individuals will be considered when military necessity permits.

Its objective is to bring the entire weight of U. S. airpower to bear against Japan. . . . Here are some answers to the how and why of the program

The aim of redeployment is to get into position all the men and weapons necessary for the final blows against Japan. The AAF's new Troop Basis—that is, its share in the responsibility for providing an Army of about 6,968,000 men for the Pacific war—has been established. The disposition of the new air order of battle has begun.

Apart from mere totals, there is an immediate need for particular types of units to reduce Japan's ability to resist. These units were the first to get movement orders to the Pacific. Many are going direct. Some are being flown to their new posts; others are moving as rapidly as possible by water.

The military necessity which dictates the speed of their transfer is obvious: new airbases must be built and put into operation before tactical units can go to work in the Pacific. When swift movement has prevented some of their personnel who are eligible for release from being "screened" in Europe those men will be returned to the United States from the new theater as soon as possible.

For several weeks, reorganization has been going on among AAF units in Europe. Essential units to be redeployed through the United States to the Pacific have been chosen. The sick and wounded, regardless of their former assignments, are being moved to the United States as fast as their physical welfare will permit. Recovered prisoners of war, escapees, and evadees have also been given high priority for transportation to the United States. Whenever possible, men with highest ASR scores have already been transferred to organizations destined for the United States and demobilization. Men with somewhat lower scores, including some who served in both the African and European campaigns, are being assigned to units of the Occupation Air Force.

At European stations and at both air and water ports of embarkation, everything possible is being done to assure simplified processing of those who return to the United States. According to necessary priorities, transportation is being made available as fast as possible in view of the tremendous mileage involved.

From United States ports of debarkation, personnel of redeployed units will move to reception stations chosen before they left Europe. After brief processing, they will be granted a rest period up to 30 days, will reassemble as a unit and begin preparation for their new assignment overseas.

Concerning the free time allowed men before they assume new duties, several points are worth noting. First, this period—called "R, R, and R" for recuperation, rehabilitation, and recovery—will not be included in annual leave or furlough. Second, it can be spent anywhere in the United States. Third, the Army pays for transportation to and from a single destination; side trips taken during this period are at the individual's expense.

The second type of unit—coming to the United States for inactivation or demobilization—will move to a disposition center in the U. S., where unit records and property will be turned in. Then personnel of the disbanded unit will

move to reception centers, where essentiality of individuals will be finally determined. Non-essential men will go immediately to separation centers and into civilian life. Those declared essential will be granted RRR up to 30 days before entering their new assignments. Although processing has been simplified, transportation of these units to the United States is likely to be much slower than that of redeployed organizations.

Redeployment training, which will follow leaves and furloughs for those bound overseas, must be varied. Some units flying the same type of plane which they used against the Germans will be ready for quick transfer to the Japanese front. Others will enter thorough retraining. Crews and ground personnel transferred to the very heavy bombardment program, for example, will pick up additional personnel and learn new techniques.

During redeployment three points of reorganization and training will be emphasized. First, group and squadron "teams" will be kept together if possible. Second, men inexperienced in combat will not form green units; they will go as replacements in groups built around seasoned cadres. Finally, although training "on the spot" in the theater will continue to be part of the AAF's plan, every group will leave the United States trained and equipped for combat.

As for officers and men moving as individuals,—casuals they are called—they will be formed into reception station groups. Their essentiality having been finally determined at the reception station in the U. S., they will go to separation centers or be granted RRR before their return to new duty assignments.

What about "those who wait" in Europe? Delays in transportation will keep a large number even of those eligible for release; their wait, the War Department has announced, may last several months. Many of the men who have had long and hazardous combat were brought by air to European ports of embarkation. Every month the ATC, with the help of the TCC, will lift a total of 50,000 men. Aircrews of many tactical aircraft are flying their own planes back to the United States. More than 1,600 ships will be engaged in the Transportation Corps' general operations of moving men and supplies. Yet military necessity makes a slow calendar; even at the fastest possible rate of water and air transportation some men must spend a long interval in Europe before coming to the United States.

Among those waiting in Europe will be a balanced combination of units forming the Occupation Air Force. Part of an army of about 400,000, this force will cooperate with the British, Russian, and French air arms in maintaining order. Its members, most of whom will have relatively low ASR scores, will carry on a program similar to that of other air forces in inactive theaters. Necessary as its job is, the OAF repeats the question heard throughout the AAF in Europe, "When do we go home?" That time—at least for the majority—is likely to be delayed until after Japan's surrender.

Apart from their military responsibilities, members of the AAF who are detained in Europe will have the advantage of extensive education, recreation, and travel programs. For example, a typical fighter base has already set up a unit school offering courses in Business Arithmetic, French, American Government, Livestock Production—subjects for which prospective students voted. Instructors have been chosen, texts collected, and a counseling system for obtaining high school and college credit established. Individual courses are limited to two months, and in no case will a man's return home be delayed by the program.

In addition to unit schools, Technical Training Centers for specialized study and Army University Centers for advanced students are being planned. Supplementing this more formal instruction, tours to many important European centers will be conducted for all Army personnel. At first, the range and variety of these tours will be limited by lack of transportation facilities; later they will be extended.

Sports and hobbies are being organized at all AAF stations in Europe. Like courses of study, these activities are being selected by the men. Generally, the program will be informal, but there are plans for larger tournaments and stadium games.

* * *

Specific questions about individual prospects during the redeployment period are often unanswerable. Some of the most common inquiries are set down here. For the present, security restricts the details of the answers, and time will, of course, change many of these conditions.

1. *Are AAF units in the Pacific included in the total of the 1,332,000 men eligible for discharge during the coming year?*
   The answer is an emphatic yes. In round figures the War Department has divided the eligibility totals as follows: Europe, 650,000; Pacific and Orient, 433,000; United States, 249,000. The rotation program for the Pacific and Orient will also continue. For both systems, rotation and demobilization, Germany's surrender means more replacements for men fighting the Japanese.
2. *Can an enlisted man in a theater of operations or in the United States waive his right to release under the Adjusted Service Rating?*
   This can be done—and it has been done by men with scores above 150. On the other hand, a man should be sure of himself before he makes this decision.
3. *Is the Distinguished Unit Citation counted in the ASR score?*
   This award is not included among those for which point credit is given.
4. *What is the rule for release of married Wacs?*
   A member of the WAC whose husband is released from service is eligible for release herself, regardless of ASR score.
5. *Will the discharge of enlisted men over 40 years old be continued?*
   Redeployment has had no effect on this practice; such men can still be released.
6. *What is the AAF's general policy concerning the release of officers?*
   In all the armed forces, the decisive factor in the release or retention of an officer is "military necessity." Officers who are commissioned in the Air Corps (AUS or Reserve) and who are not required by the AAF can be released immediately unless they have a Military Occupational Specialty which appears on a very limited "critical shortage" list. Officers who are commissioned in other arms or services and who are currently assigned to the AAF but are surplus to its needs must be referred to the major force having jurisdiction over the arm or service in which they were commissioned. If they are non-essential to that force, they will be released. If they are essential, they will be transferred to a unit in the force needing their services. In the consideration of an individual officer's case for release, three points besides the need for his services will be considered: (a) his Adjusted Service Rating score, (b) his desire for release or retention, and (c) his usefulness to the Army as indicated by his efficiency index. A survey of AAF officers covering these points is being completed.
7. *Can a pilot returned from a combat theater be con-*

(Continued on Page 26)

Our 30,000-foot Periscopes

BY CAPT. L. P. BACHMANN
AIR FORCE Overseas Staff

These Photo B-29s are expert at putting Jap shipping "on the spot" for our Navy

It was a routine mission. The photo B-29 (F-13) was on a reconnaissance assignment over the southern islands of Japan. Its job was to photograph various military and naval installations. As the plane came within sight of Hiroshima in the Jap Inland Sea, the crew spotted more of the Japanese Navy than they had ever seen except in photographs.

It was one of the juiciest photo-reconnaissance targets of the war, but the F-13 was unable to get photographs. The plane was so low that any attempt to get within camera range would expose it to the extremely accurate and heavy flak batteries of the enemy warships; it couldn't go any higher because its engines were giving turbo surges instead of power. The pilot, Capt. Alvin Coe, had been instructed not to break radio silence under any circumstances. Only by returning immediately to his China base could he get information on this important target through to headquarters in time to be of any use.

The flight engineer, forced to put on high power settings requiring high fuel consumption, reported that there wasn't enough gasoline to get the plane back to its original base. The pilot headed for an advanced emergency field.

The weather closed in, and Coe flew in an overcast most of the way. A sudden break in the clouds revealed Jap-held Nanking only 5,000 feet below, but the hole closed up before the AA fire started. Then information was received that the forward field was socked in. Bomb bay tanks were dropped, and a "skin of the teeth" landing made at the next advanced field, where the information was flashed to headquarters.

The sequel came on March 21, 1945, when Fleet Admiral Chester Nimitz announced that an American carrier task force had destroyed or damaged half of the Japanese fleet at the spot where Coe's plane had located it.

The above is an exceptional case, for wherever possible these lone B-29 photo planes fly at high altitudes, 30,000 feet and up.

In carrying out assignments for both General MacArthur and Admiral Nimitz, F-13s of the 20th Bomber Command's Photo-reconnaissance Detachment have operated over northern China, Manchuria, the China Sea, the Philippines, and Japan itself. In October, 1944, both the Army and the Navy requested reconnaissance information for maps of the northern coast of the Philippines, with particular emphasis on Lingayen Gulf. The Superforts mapped the specified area, returned to their China bases where their photographs were developed and flown immediately to the proper Army and Navy headquarters in the Pacific. It wasn't until January 1945, with news of our Luzon landings, that the importance of this assignment was realized.

During the subsequent Luzon campaign, these F-13s were assigned to continual reconnaissance of Kyushu Island, the southernmost in the Jap home chain, and the staging area for all enemy aircraft shuttled down to the Philippines. The specific task was to provide photographs from which actual counts could be made of the number of enemy airplanes on the various Jap fields.

On Kyushu, the photo men discovered 22 new airfields and relocated 10 others. But their most important work was in what they did not find: intensive coverage proved that 5 airfields which were on our maps actually did not exist.

During the middle of March, the Navy put in a special request for the F-13s. Another important landing was to take place, and it was necessary to make regular reconnaissance runs over the East China Sea. The task was to look for what was left of the Jap fleet so that our Navy could prevent it from hampering our latest real estate venture in the Pacific. Daily missions found some small portions of the Jap Navy and considerable merchant shipping. From the information provided by the F-13s, our submarines hunted out these remaining elements of the Nip fleet.

The payoff came on March 25 when a Navy task force hit Okinawa in preparation for our landings a week later.

The F-13s of the 20th Bomber Command Photo-reconnaissance Detachment are now operating far ahead of the war. As the Army and Navy carry out combined Pacific operations, an important assignment of these long range photo planes is to secure data pertinent to future landings.

Ever since photographic planes came into use, they have been called the "eyes of the AAF." The Navy has another name for them—they refer to these high flying F-13s as "our 30,000 foot periscopes." ☆

With the invasion of Okinawa, a new type of ATC unit received its baptism of fire

Air Transport Commandos

By Maj. Milton R. Krims

AIR FORCE Overseas Staff

A tiny black dot moves across the sky. The dot grows into a huge, shining C-54. It makes a perfect landing, throwing up clouds of dust, and a man wearing gun and helmet waves it toward a large, shell-shaped revetment. The pilot cuts his engines and hears the rumble of not too distant artillery. Meanwhile, the doors are opened and heavily armed men grin up at the new arrivals, and one of them shouts, "You should have been here when it was *really* rough."

Everyone laughs, because the wisecracker had set foot on Okinawa only an hour before, having arrived in the first ATC plane to land. This newcomer was the second. The time: 8 April, 1945—seven days after L Day.

After the one brief pleasantry, the men get to work. No time can be lost getting the unarmed C-54 back into the air again and on its way back to a rear base. Sixteen litter cases are loaded into the plane. They have to be carried up steps as the fork lift has not yet been assembled. Then the walking wounded, a few high priority passengers, some mail . . . and at the last moment, a new enemy weapon that must be speeded to Washington for technical examination. In exactly one hour and forty-five minutes, the big C-54 is taxiing toward the strip for a take-off.

These first two ATC planes had also brought their priority cargoes into Okinawa: key ATC personnel, a 250-gallon water truck, a baby bulldozer, two jeeps and a trailer, a fork lift and an airborne tractor. ATC was ready to go into business. Already they had a sign up on Yontan airstrip: AIR TRANSPORT COMMAND WELCOMES YOU TO OKINAWA, PARADISE OF THE PACIFIC, EVERY DAY A FOURTH OF JULY.

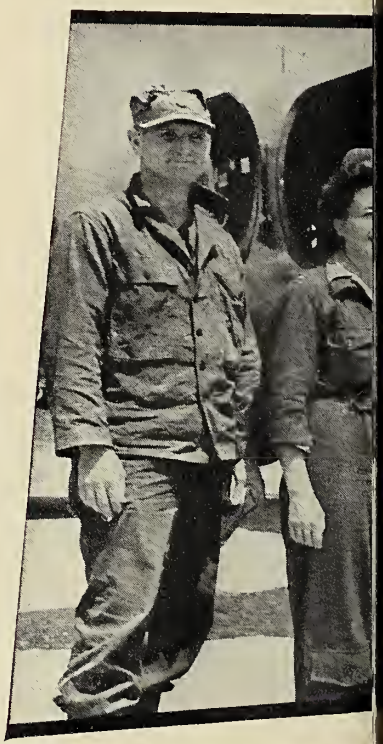
Planning for the Okinawa invasion began in the fall of 1944. From the very first it included participation by ATC. By the end of January, the Pacific Division was ready to proceed with its own plans for active participation. A new type of ATC unit was born at Hickam Field, Hawaii. Of the twenty men who made up this advance unit, under Lt. Col. James W. Luker, all were in overseas service . . . and all had volunteered for this special assignment. They had no idea where they were going but they did know it was into a forward area. They kidded each other, called themselves the Air Transport Commandos.

On March 6th, the entire unit moved to the Marianas, and on March 10th it was activated as an AAF Base Unit. At that time it consisted of 65 men, the nucleus of an eventually much larger organization.

For the first time in ATC history, its men received intensive combat training. They labored through the usual field exercises, learned about chemical warfare, tent pitching, carbines and machine guns. They had target practice, took long hikes with full packs, generally toughened up. In the evening, they listened to lectures on cargo handling, aircraft maintenance, advance base conditions. They were lectured on first aid, care of the body. And still they didn't have the slightest idea where they were going.

Came April 1st, and the news of the Okinawa invasion. They listened tensely to the radio, speculated excitedly. On April 7th they were up and out at 0030 for a ten-mile hike. They returned hot and tired. But for the nineteen men of the advance cadre there was no rest. They were ordered to pack for an 0300 takeoff . . . their destination: Okinawa Shima.

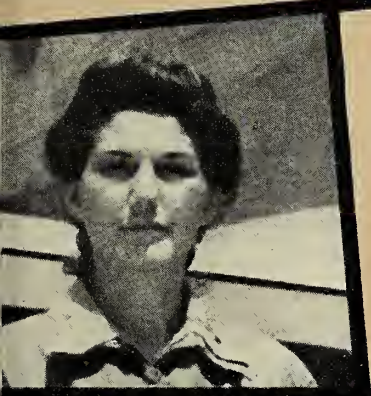
Along with the task force that invaded Okinawa was an ATC representative, Col. Luker. His instructions were to have Yontan Field ready to receive the first C-54 on L plus five. Heavy casualties were expected,



Above. Lt. Col. James W. Luker, head of Okinawa's ATC, is on hand to meet evac planes as they roll in on schedule. Pretty flight nurse joins him in a big smile for photographer.

t. ATC brings in engines, l plane parts. Here, fresh ine is trucked to Superfort t made emergency landing.

Above. Fork lift raises walking wounded to C-54's door. Other wounded wait their turn.



Left. The wounded felt a little better as soon as they saw Flight Nurse Georgia O. Doxie, tall stately brunette, step out of an evacuation plane.

Above. Fighter pilots just returned from missions read sad news of President Roosevelt's death in newspapers brought in by ATC transports that also carried mail.

Below. In this Jap-built revetment, ATC set up its office, covered entrance with wall of sandbags. Wounded were kept in revetment until picked up by planes.

bove. Replacement troops climb down om C-54 that flew them into Okiawa. This plane will evacuate wounded.

ight. Soldier wounded in foot and left and is gently helped to C-54's door.

and it was up to ATC and its Air Evacuation Units to help get them out.

Colonel Luker, working in close collaboration with representatives of the Tenth Army and the Aviation Engineers, immediately inspected the two airfields, Katena and Yontan, chose Yontan. The long strip was practically undamaged, there were plenty of Jap-built revetments to provide cover for both wounded and personnel during air raids and artillery shelling. Every move was considered from the viewpoint of enemy action, strip maintenance, communications, parking and handling of patients. ATC opened its office in a revetment.

Yontan was ready on L plus five, but Tenth Army made no request until two days later. The message from Comfor Area received April 7th, stated simply that 10th Army requested commencement of transport service to Yontan Field, Okinawa Shima. The first C-54 would depart 8 April at 0200, the second at 0400.

Because Okinawa time was one hour earlier than Guam, it was decided to change the time of departure to 0300 and 0500. Other last minute changes were made; 1000 pounds of mail was added and each airplane carried enough gas for the round trip. The rest of the cargo consisted of ATC personnel and equipment.

The first thing arrivals on the first plane did was set up four pyramidal tents to cover the supplies. Then a party went down to the beach to scrounge K rations and additional water. Others got to work assembling the fork lift and other necessary equipment. Still others searched for bomb proof shelters, got themselves set up in the Jap revetments. It was a busy afternoon; they could hear the artillery only a few miles to the south, they could see the swarms of fighters hurrying to and from the not too distant targets. And as they worked, they carried pistols and carbines and seldom left helmets out of reach. They knew they must work fast because the Japs would come visiting any time.

Sure enough, the sirens wailed a red alert at 1900. They scrambled to the shelters, but there was no attack, and an hour later the sirens sounded the all clear. Certainly they were grateful because none had had any sleep since 0230 the day before. They crawled into their cots, were soon out again searching for more blankets. It was cold on Okinawa.

At 0400 all hell broke loose over Yontan Field. It seemed that every gun within a radius of five miles started shooting at the same time. The sky was a spider web of red tracers. They fell out of bed, jumped under their helmets, furtively peeked out to watch as seven Jap fighters were shot down. It was their first taste of combat, and when it was over they climbed into the sack feeling like veterans and prepared now to sleep away the rest of the night.

At 0600 the sirens bounced them out of bed again. Nothing happened except that they were annoyed. The Japs were getting to be pests. And tomorrow—no—today was another work day regardless of their loss of sleep—more transport planes would be coming in a few hours and have to be serviced.

The planes came in on schedule, one at 0930, the other at 1135. They left in a few minutes over an hour after arrival, each carrying 28 litter cases plus walking wounded and mail.

The big C-54s continued to come in and depart on schedule. The men serviced them as best they could with what facilities they had. The medics cared for the patients with gentleness and efficiency. Customers lined up to present orders, be assigned priorities and space on outgoing airplanes. And even as at Hamilton, Biak, Paris, Calcutta or Guam, passengers huddled together to sweat out rides and gripe about having to be in Washington or New York or Sydney practically the day before yesterday.

And yet it was different. There was always the distant thunder of artillery, the roar of fighters hurrying somewhere. And there were the passing vehicles of active war and the ambulances carrying the wounded. Everyone, including the passengers, carried weapons and wore or carried helmets. And while they waited, they wandered through the ruins of a nearby Okinawa village, marvelled at the magnificent masonry of the stone walls and the graceful curves of the tiled roofs, admired the finely lacquered trays and low tables and even gaped at the kind of dishes you used to see at Little Tokyo's Oriental Bazaar at home . . . and wouldn't buy for a dime a dozen. And always the dust was like a fine blizzard caking everyone and everything with a gray-tan patina.

At 0200 the morning of the twelfth, the siren sounded the warning of what turned out to be the biggest raid yet. Nineteen Jap aircraft were shot down before the all clear sounded two hours and forty minutes later. The men returned to their tents, ready for sleep. Twenty minutes later there was a loud explosion less than a hundred yards from the center of their area. Several of them were knocked out of their beds, badly shaken. Two passengers waiting to go out on the morning plane were injured, one seriously. From out of the darkness came anxious calls for ambulances, medical assistance. The explosions continued; they were being shelled by a Jap 105 dual purpose battery. At 0630

(Continued on Page 61)

Tired, dirty, wounded, these soldiers, brought back from the front lines on Okinawa, wait patiently for ATC planes that will fly them out.

When the Mustangs came in for close air-ground coordination in Luzon, the doughfeet cheered from their foxholes

THE INFANTRY LOVES IT

BY CAPT. JOHN E. RHODE

Support Aireraft Controller, 5th Air Foree

ILLUSTRATED BY SGT. LOUIS S. GLANZMAN

We are situated on a rise of a hill in Luzon, overlooking the Jap front line. Our radio-equipped jeep is at the foot of the hill and beside us is a field telephone. From our foxholes, dug on the very top of the hill, we ean see the Japs at their guns, eovered with weeds. From time to time we see the weeds rise, a gun muzzle push itself out, and a flash of fire. Oeeasionally, the rear extremities of a eareless Jap, or a leaf-eovered helmet ean be distinguished as the little men creep among their dugouts.

A distance of 600 yards separates us from the Japs, but there is a valley in between and the situation is stalemated. If we advanee now, we will get maehine gun fire full in the faee. If we try to steal up the steep sides of the opposite hill, Jap snipers, who have a habit of appearing out of nowhere, will have things too mueh their way.

H-hour this morning is 0900. Our artillery is already beginning to pound the enemy on the frontal slope. The air is thiek with whistling shells. Dirt and dust are flying everywhere. From the rear, we ean hear the drone of tank engines and, now and then, the boom of the big guns behind the infantry.

We know it is time for the show to begin, and also time to call in our planes for elose air eoordination with the ground troops. We pick up the field telephone and eall "Red Leader," eode word for the eommander of our already

airborne fighters. We identify our aireraft eontroller station as "Rhinestone." Nothing but a crackling sound responds. We repeat, "Rhinestone calling Red Leader. Come in, please. Over." Still nothing.

As we wait for a reply, we wonder if the P-51s will be on time. This split-seeond timing is a ticklish business, the worry of keeping our fighters from strafing our own troops.

Still no contaet with Red Leader. One last look around, a final eheek. We ean see our front line and the big white panels indieating our forward positions. There is one off to the left, two on our right, and two more in front of us and a little below. Just behind and a little above us is a big white arrow pointing to the opposite hill, today's objective.

We make a cheek with the artillery. "Artillery from aireraft eontroller. Are you ready? Over." The answer comes promptly. "Ready for your instruetions. Over."

That means the artillery will have smoke shells set to put the finger on our Jap neighbors as a guide to the fighter planes.

Five minutes to go. Where the hell are those P-51s? Another call.

"Rhinestone to Red Leader. Come in. Come in. Over." This time we make contact.

"Red Leader to Rhinestone; Roger. What are your instructions?" The curtain is ready to go up. One more look around before we give the fighters their first instruetions. Then, "Rhinestone to Red Leader. Orbit off to the west, and I'll silenee artillery to clear the target for you."

Artillery is told that the planes are heading in. The guns are to fire only white phosphorus to mark the target. Another peek over the edge of our foxhole at the Jap lines. All quiet. "Red Leader from Rhinestone. Do you know your target? Have you the eorreet photos? Do you want any further instruetions?"

"Rhinestone from Red Leader. We know the target; we have the correet photos, and will follow your instruetions. We are orbiting west of target area and have it spotted."

"Rhinestone to Red Leader; good boy. Artillery will mark the target with smoke in two minutes. Target is at three o'eloek from your present position. Will you make a dummy run over the bald spot on the hill, directly opposite the white arrow marker? Trajectile path is south to north at your present altitude and position. You are elear of this path."

"Roger from Red Leader; we understand."

"Artillery from aireraft eontroller; planes are ready for you to mark the target."

"Back to aireraft eontroller from artillery. Smoke is on the way. Will be on the target in 60 seeonds."

"Rhinestone to Red Leader, your target will be smoked in 50 seeonds. Do you have it? Forty seconds, thirty . . . twenty . . . ten . . . there it is Red Leader. Do you see it, Red Leader? Right over there on the eastern slope."

"Roger. We see it."

"Back to Red Leader. There are heavy machine guns, caves and dugouts in that area. The wooden spot 100 yards west has a battalion of Nips. Behind the hill are mortar positions. You are to attack and destroy them. The target is all yours. Go get 'em."

We listen in as Red Leader instructs his planes:

"Red Leader to Red One, first flight will attack after me. I'll make a dummy run to be sure of the target and have Rhinestone give me an OK on the spot."

The Japs know what is going on, and their traeers start coming up from their positions. This fire further defines the target for us. Red Leader dives in at 400 miles an hour and the P-51s buzz the target right in the face of the fire.

"Hello, Rhinestone, was that the right area? Lousy shots, aren't they?"

"Rhinestone to Red Leader. Roger Dodger, old fellow. That's the spot. Drop 'em there and you'll bring home the kewpie doll."

"The infantry boys, with smiles on their unshaven faces."

Again we listen in as Red Leader instructs the other pilots:

"Red Leader to Red One. Four planes will attack the target. Follow me in and I'll mark it with the first bomb. Then give 'em hell, gang."

"Roger, Joe. I'm right behind you, with Jones, Burke and Smith."

"OK, fellows let's go. Give 'em the works."

The bombs whiz in. Smoke, dust, guns and parts of Japs are flying through the air.

"Red Leader to Red Two and Three. All right, boys, follow our tail and put it where they like it the least."

The next two flights of P-51s follow in and drop their bombs on either side of the first flight's area. The air is red. Then there are elouds of white and yellow smoke, with black speeks turning lazy loops in the center of it. Noise and eoncussion is incessant. The infantry boys are on their elbows with big smiles on their dirty unshaven faces. They are shouting, but the thunder of bursting bombs drowns them out.

The Japs are breaking and running around like bewildered monkeys. Some of them are just lying there like burst bags of rice; others are crouehing in their foxholes dazed and wondering, perhaps, why their own air foree doesn't eome.

"This is Red Leader to Rhinestone. Last run eoming up."

"Roger, Red Leader; swell job. All the bombs right in the pot. Good work. Good work. The infantry is cheering like mad down here."

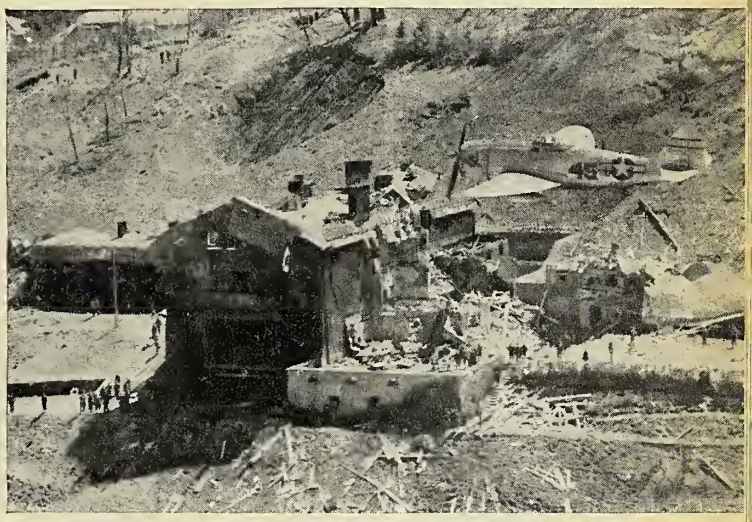
"Roger, Rhinestone. Tell the boys we'll be up tomorrow and to save us some souvenirs."

(Continued on Page 56)

SCRUBBED!

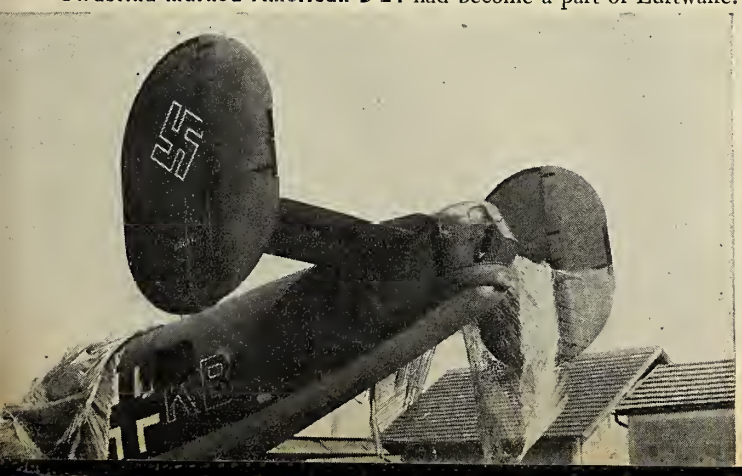
Half-buried in its revetment with camouflage draped like crepe on its tail, this ME262 jet was one of many planes abandoned by Nazis.

Near Berchtesgaden, Hitler maintained a field well-stocked with planes, presumably to be used for a quick getaway. But the Allied Air Forces struck fast, shattered the field and Hitler's escape hopes



P-47 buzzes debris that was Hitler's palatial Berchtesgaden home.

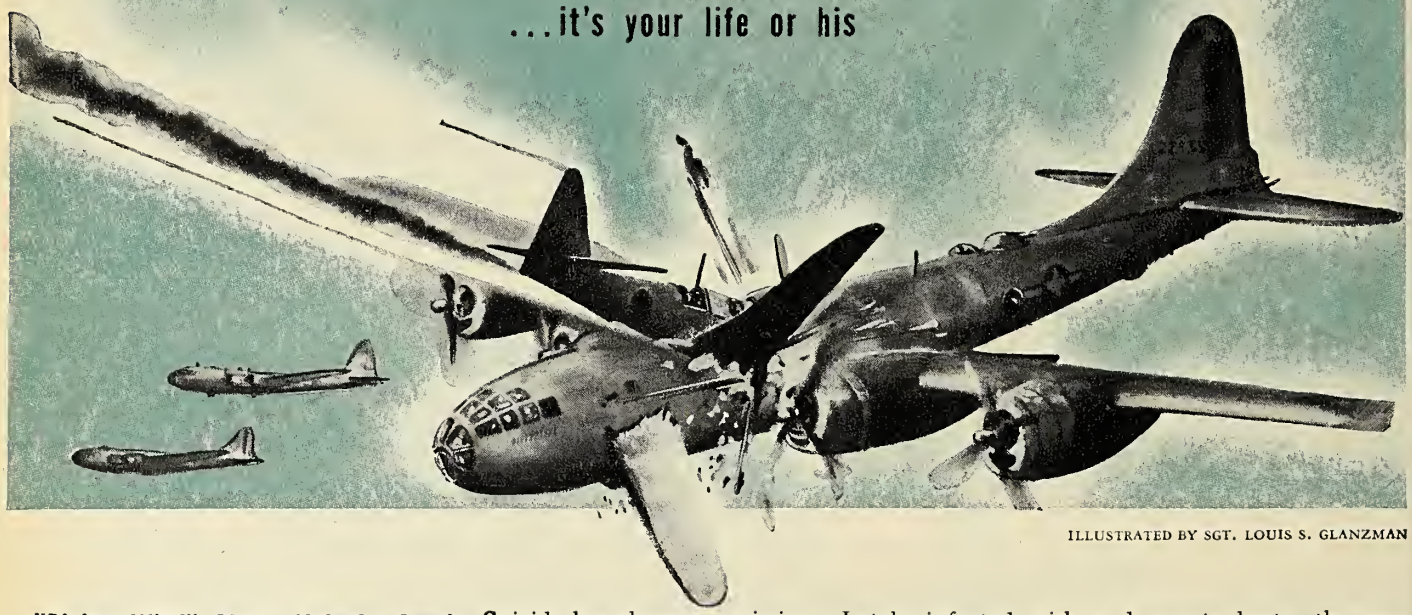
Swastika-marked American B-24 had become a part of Luftwaffe.



JU290, probably Hitler's private plane, stands over ME109.

THIS IS YOUR ENEMY

...it's your life or his



ILLUSTRATED BY SGT. LOUIS S. GLANZMAN

"Divine Wind" Blows Nobody Good. Suicide has always been incidental to warfare. It is not an Oriental phenomenon. With different motives, the conquered Roman who fell upon his sword and the Anglo-Saxon warrior who refused to outlive his chief chose this mode of death. In modern combat, pilots of all nations have occasionally plunged hopelessly damaged planes into an attack that would make their own deaths more costly to the enemy. In Japanese warfare, however, suicide is not occasional. Having formalized self-destruction by hari-kari, the Japanese translated the principle into aerial tactics. "Kamikaze" pilots, boasting the name of the tempest which is supposed to have saved their homeland from Kubla Khan in 1281, are moved by something besides heroic inspiration or patriotic metaphor (See "This Is Your Enemy," AIR FORCE for April).

The Kamikaze program can be measured by several yardsticks. Logistics for the plan are simple; suicide planes are cheap and easy to build. As for training, the Japanese originally announced that suicide missions required only brief instruction. Jap pilots could have told the propagandists that hitting the air is one thing and hitting a target quite another. Even a battleship or a B-29 formation is not big enough for a rank amateur. A third advantage that the Japanese expected was purely psychological. They hoped to terrify the Allies, "who believe in conserving human life and will therefore not comprehend mass suicide attacks."

Organized Kamikaze operations began last autumn, during the landings at Leyte. By January, when the fleet moved into Lingayen Gulf, the program had been stepped up. Principal targets were ships and bomber formations. Chief instruments were piloted Baka ("Folly") bombs, the variant suicide plane-bomb named The Viper, and ordinary run-of-the-line planes. The special suicide craft arm their explosives at the instant of release from the parent plane; so the pilot has little chance of survival.

To whip up home-front enthusiasm for the "Divine Wind" pilots, the propagandists have carried on a long campaign. In addition to popular acclaim, the suicide flyer was offered better living quarters, better food, and high military courtesies, including a funereal take-off on his final mission. Lately infected with a desperate haste, the program has cut down this etiquette of suicide. Pilots are still guaranteed two promotions, both posthumous.

This grim business has not been underestimated by the Allies. Any suicide attack may be damaging. Even if one out of every hundred Kamikaze dives and glides were completely successful, however, the meager results of the other 99 would cost the Japanese too much. Mere flesh, blood, Baka bombs or Vipers cannot do the work of that Kamikaze that blew in 1281.

Pink Light from Below. From the ground, the Japanese view of the war is glum. Domei's correspondent in Tokyo has described a B-29 fire mission from the underside. "The storm of fire caused by incendiaries swept whole districts," he writes. "That bright starlit night will remain in the memories of all who witnessed it. After the first incendiaries fell, clouds formed and reflected the pink light from below. The Superfortresses flew unbelievably low over the central fires which spread gradually. One B-29 flamed like a tracer bullet above the city. . . . The Diet building stood black against the sky. That night we thought all Tokyo had been reduced to ashes. If the enemy imagines, however, that he can crush the Japanese people, he has made a big mistake. The Emperor deigned to visit the stricken areas. He went on foot, exposing himself to the cold wind."

People's War. As a god, Emperor Hirohito is immune from political upheaval. Yet restlessness inside Japan is increasing. Suzuki is no more free of critics than his predecessors. "Reorganize the Government!" "Give us a Stalin!" "Quit talking about peace." This is the newspaper chorus. The most thorough change resulting from the new government's policies was reorganization of the "party" named the Imperial Rule Assistance Political Society. Last month it closed its books. In its place Japan has a People's Volunteer Corps. Incorporating all the political auxiliaries it will be the Combat Corps in case of invasion. To assist its work, the Minister of Education has mustered all Japanese students. Farmers are signing up in a new Agrarian Militia.

THIS WAS YOUR ENEMY

notes for an epitaph

What's in a Name? They called it the Luftwaffe. It was ten years and two months old when it came to an end in May, 1945. Six years of growth and uncertain conquest and four of gradual disintegration and defeat were the sum of its official history. At the finish, this former scourge of Europe had lost its fearsomeness. The terror-striking Stuka force was gone. The Focke-Wulfs and Messerschmitts that had borne the brunt of Allied attack were outmoded now, outnumbered, and outfought. Supplies of fuel and ammunition had dwindled. Even the exciting promise of a jet-propelled force of ME262s and AR234s was still only a promise. Many evidences of former power remained, but the enemies of the German air arm had long since surpassed it.

At the start, the GAF had been called the "Luftwaffe" to signify that it was an "air weapon" for attack. Yet the last aerial offensive device of the Wehrmacht was named for Vengeance. The Vergeltungswaffen—both V-1 and V-2—were signs that the most arrogant of air forces had descended from plans of world conquest to blind retaliation.

By May, 1945, the withering rolls of the Luftwaffe had lost the convincing echoes of the earlier German air roster —von Boelcke, von Richtofen, and Immelmann. The Luftwaffe's curtain speeches were spoken by Goering, who reported that his Leader had sentenced him to death; by Kesselring, whose malevolent talents had brought him an odd kind of fame; by Stumpf, to whom fell the dubious distinction of signing the Luftwaffe into oblivion.

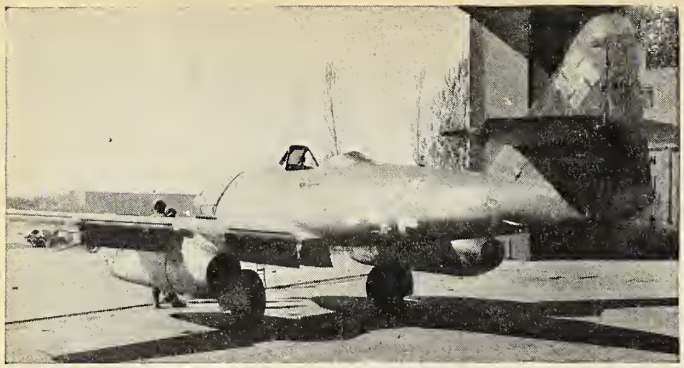
The Roots Went Deep. The branches of what Hitler once called the "mighty tree" were lopped, but the Luftwaffe's roots struck far back into the years of peace. Defeat did not tear all of them up and into sight. From the days of Lilienthal's experiments and the earliest German enthusiasms for getting off the ground, down through the period in the first world war when Fokkers were the most dreaded plane on the Western Front, the traditions of German aviation were distinguished, and not ungallant.

In the waiting time of peace, German air activity sprouted everywhere in glider clubs and in the innocent sounding DLV, or Deutsche Luftsportverband. Popular enthusiasm for "air sport" joined with shrewd nationalism to make a scant allowance of 36 flyers suffice for the entire Wehrmacht training program—by the simple device of rotating the flyers engaged in this private sport. Under the tutelage of General Milch, canny business sense expanded Lufthansa, the commercial airline, into a training ground for the secret Luftwaffe.

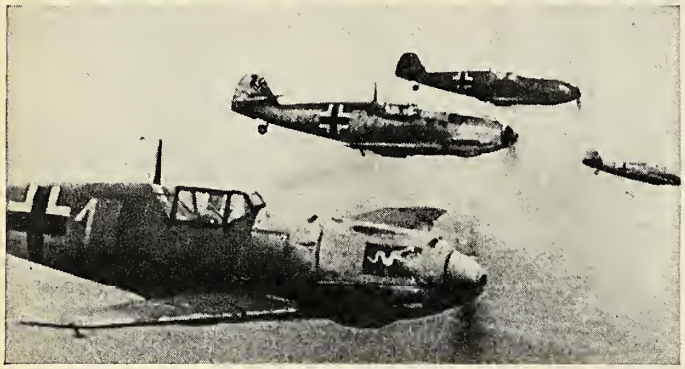
To many an individual contribution the Luftwaffe grew indebted—to the brilliant designs of Willi Messerschmitt, to the painstaking experiments of Drs. Dornier and Junkers, to the swashbuckling airmanship of Ernst Udet, a better artist than Hitler and a better pilot than Goering. Other names which were to sound through the operations of a second world war were heard in German flying circles in those days. The team of Focke and Wulf had produced the FW56A and enrolled an assistant named Kurt Tank, who was to give the Luftwaffe one of its last 1944 models, the TA154. Dr. Heinkel, too, was busy; HE70 had been produced and HE111 was on the boards.

When March, 1935, brought the Luftwaffe into the open, Hitler chose Goering to command it. Not the least reason was that Goering had been one of the German pilots

German pick-a-back plane was operated by pilot in ME109 who released bomb-laden JU88 over target, directed it by radio to its mark.



Nazi jet plane, ME262, was found intact at field near Stendal.



ME109s, with appropriate snake insignia, getting ready for attack.

HE 111s roar over Channel with full bomb loads during 1940 blitz.

who refused to surrender in the first world war. Other die-hards had fought their way on up through Latvia or disappeared into South America to fly dangerous hinterland routes. More practical, Goering had remained in Germany to become Minister of Air Transport. When he moved into the Luftwaffe command, he was accompanied by strong assistants, including Stumpf, of the General Staff, and Kesselring, who headed Administration. Then came the period which newspaper readers considered mainly one of panoply and display—such as party rallies over which 400 aircraft flew. A few of those readers lingered over the speed records which Messerschmitts were setting in air trials. Still fewer remarked the maneuvers in which the Luftwaffe practiced cooperation with the Army. Meanwhile, the businessmen were not idle; the first budget of the new air regime was jumped from 78 to 210 million marks. Without much irony and with no trepidation, air yearbooks for three years before the war made such entries as, "The new Reich is deeply interested in aviation." That was historic understatement.

Mournful Numbers. In the later years of peace and often after 1939, popular impressions of the Luftwaffe have emphasized numbers. Nazi propagandists played on the fearsomeness of the GAF's mass of fighting planes. All legitimate sounding boards—and some that were not so legitimate—were used to advertise as widely as possible the hugeness of the aircraft reserve. When evidence was needed, a skyful of JU52s served to fill in for first-line bombers, since JU52s had been used for bombing in Spain.

There is no question about Germany's numerical superiority at the beginning of the war. From January, 1939, to September of that year, the GAF's first-line aircraft increased from about 3,000 to about 4,300. From then until Dunkerque, the RAF made no secret of the fact that it was outnumbered. It was not an accident of war or any painless order of events that canceled the Stuka threat, turned back the Luftwaffe from Dunkerque, won the Battle of Britain, defeated the FW190s and ME109s in Africa, and brought the separate tides of aerial warfare into full sweep against Germany during the great European offensives from 1942 to 1945. It was a bitterly fought series of air campaigns. Each was exceedingly costly. There are good reasons, therefore, to speak figuratively of "sweeping the Luftwaffe from the skies."

Yet that is only a mouthful of words if it implies that even in the last months of the war the Luftwaffe had no planes. The GAF's first-line strength remained remarkably steady to the very end. When the United States entered the war, Germany had about 4,000 first-line aircraft; in January, 1943, the strength had increased slightly; by January, 1944, the total was perhaps 5,500; at the beginning of this year it had shrunk to about 5,000. From April 10 to April 18, the 8th Air Force alone claimed almost 2,000 planes of all types destroyed in the air and on the ground —many of them lined up wingtip to wingtip on dispersal fields, out of gas. Altogether, many more German planes were destroyed in the last four months of the war than the entire Luftwaffe had boasted during the globe-shaking advances into Poland and Russia. Outnumbering the Luftwaffe had been only one means to Allied victory.

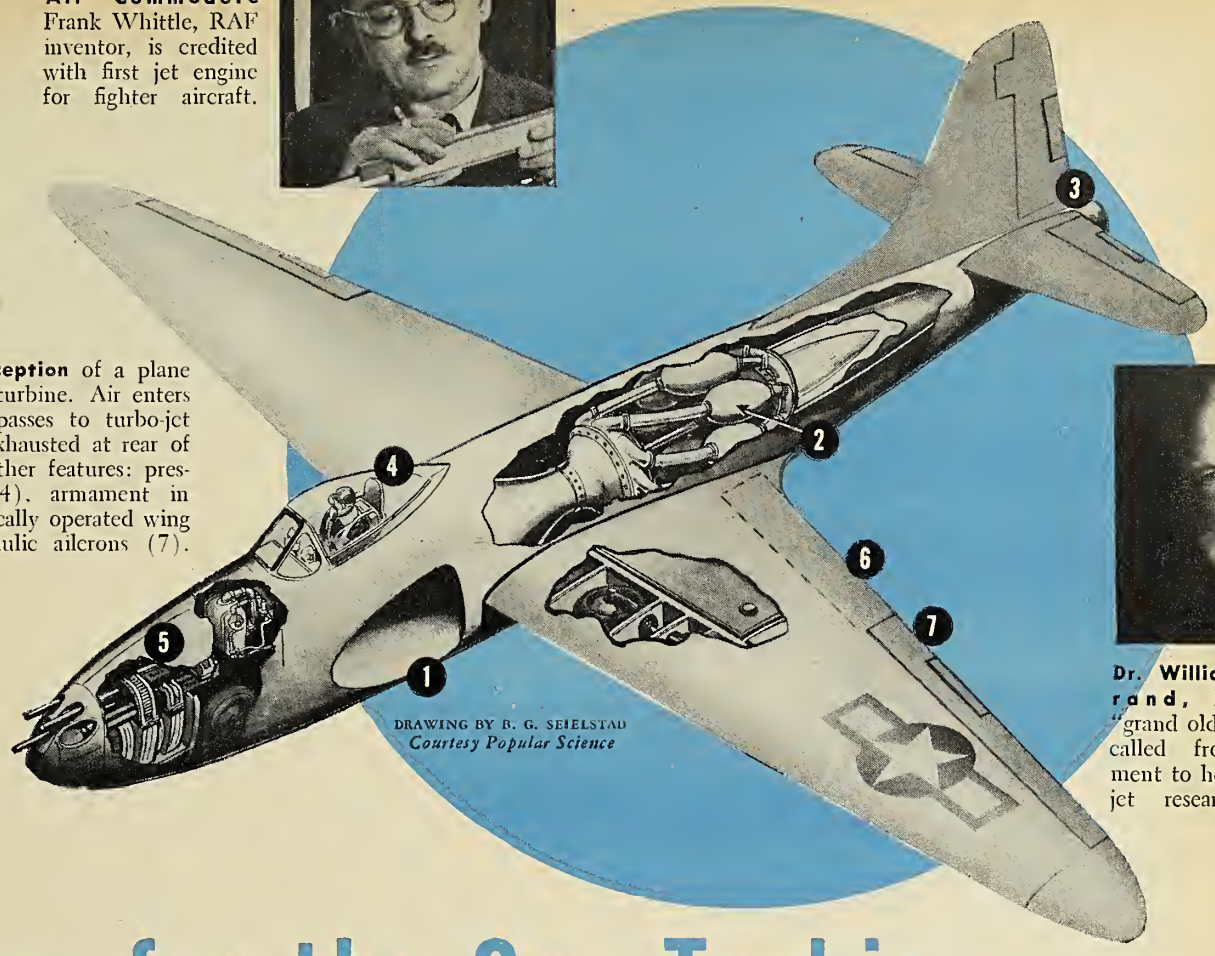
Nemesis in the Air. There will be no completely logical calendar of Germany's defeat until all the facts about the GAF's strategic planning are known. Meanwhile, there are several glaring facts and several sets of loudly voiced opinions. Without sneering, a French tactician has said that the Luftwaffe fought best when it was not strongly opposed in the air. It is true that the most scintillant of the GAF's successes were the earliest campaigns in cooperation with the Wehrmacht. These initial campaigns rewrote or underscored many theories of the airplane as a flying artillery.

Not even the screaming successes of the first Stukas, however, so impressed the world as the Luftwaffe's experiments in systematic obliteration. Guernica . . . Warsaw . . . Rotterdam . . . Coventry—these were convincing demonstrations of airpower. They also put responsive speed into the Allied preparations for defense and attack. They accomplished no final victories. All that came of those smashing attacks was a series of memorable ruins, an awkward word coinage, "Coventrize," and a grim pun, "Rotterdammerung."

From Russia, Germany had learned an early lesson in the transportation of airborne troops. Before the war the Luftwaffe cooperated with the Wehrmacht in tactics of airborne warfare. The first sign of power came when 2,000 fully armed men were landed in the "peaceful" occupation of Vienna. General Student's 7th Air Division improved upon that trial in the operations which took German airborne troops into Holland, Belgium, and Norway. But it was Operation "Mercury" against Crete in which the Junkers and DFS230 gliders made history. There was no strong opposition from the air, however; when that opposition was provided, Germany's airborne success diminished, ending altogether in the operation in which the ME323s were decimated in the Mediterranean.

(Continued on Page 62)

Air Commodore Frank Whittle, RAF inventor, is credited with first jet engine for fighter aircraft.



An artist's conception of a plane powered by gas turbine. Air enters at intake (1), passes to turbo-jet engine (2), is exhausted at rear of fuselage (3). Other features: pressurized cabin (4), armament in nose (5), electrically operated wing flaps (6), hydraulic ailerons (7).

DRAWING BY B. G. SEIELSTAD
Courtesy Popular Science

Dr. William F. Durand, NACA's "grand old man" was called from retirement to head NACA jet research work.

Wings for the Gas Turbine

Before jet could become an AAF reality, the problem of a gas turbine unit that would develop sufficient thrust power and operate for long range had to be solved

Col. Donald J. Keirn left his engineering job at Wright Field in June, 1941, and went to England on a hush-hush mission. His orders made rather dull reading—"to determine the desirability of adopting package power plants and to investigate late developments of sleeve valves." But if the colonel wondered why an assignment like this should be top secret, he was to discover, on arrival, that "sleeve valves" were actually the RAF's new jet plane, and that "package power plants" were nothing less than its gas turbine engine which Group Captain (now Air Commodore) Frank Whittle had perfected and which had been successfully flight tested that spring.

About this same time, a telegram was sent from the Washington headquarters of the National Advisory Committee for Aeronautics to the West Coast home of 83-year-old Dr. W. F. Durand. Although retired, the doctor was still regarded as a top authority on gas turbines and jet reaction engines, and the message asked him to return to active duty with the agency he had fathered back in 1915. Without knowing why his services were desired, Dr. Durand immediately complied. Behind closed doors he was told that he would head all NACA research projects related to the jet propulsion of aircraft.

Dr. Durand's first step was to set up a committee for the review of early British reports on the Whittle engine. Next, a secret conference was called with representatives of the Army, Navy and the principal manufacturers of turbines in the U. S. In order to promote as extensive a research program as possible, it was decided that each manufacturer should concentrate his development work on particular types of turbines. Westinghouse and Allis Chalmers, already carrying large Navy contracts, were to work on Navy projects and General Electric was to cooperate with the AAF's development engineers.

To be investigated were the Campini-type gas turbine of Italy, the centrifugal and axial flow types of compressors, the harnessing of hot and cold air jet power, and various combinations of these. The objective of the program was determination of the jet unit which would develop the greatest thrust power and which would operate most efficiently for long range.

Meanwhile Colonel Keirn, in the company of Brig. Gen. Al Lyons, head of the AAF's Air Technical Section in England, was absorbing all available data on jet propulsion and was sending engineering designs back to the States.

In Washington, on Sept. 4, 1941, Bell Aircraft and General Electric engineers were called to Headquarters, AAF, for a special conference in the office of General Arnold.

Also present were Assistant Secretary of War Lovett, General Spaatz, then Chief of Air Staff. General Arnold pulled some preliminary blueprints from his safe, showed them to the manufacturers' engineers, and asked them to design and set up production for the AAF's first jet plane.

With this handful of rough sketches, both manufacturers immediately got to work—Bell on the P-59 airframe and General Electric on the Whittle-type engine. They were all ready for Colonel Keirn when he returned to the United States in October with complete sets of blueprints and a working Whittle engine concealed under improvised floorboards in the bomb bay of his B-24. General Electric set up shop in its old "enamelling" building at Lynn, Mass., and put a staff of 30 supercharger experts to work on the project.

The work was so carefully guarded that when Frank Whittle came to this country in May 1942 he registered at a Boston hotel as Mr. Whitely, had a private telephone line installed and a special waiter and bell captain assigned to his room. He later moved into the home of Mr. R. G. Standerwick, G. E.'s engineer in charge of jet engine development and production and during the three months of his stay in the Standerwick residence, conversation was so cautiously guarded that not even Mrs. Standerwick knew the identity of her house guest or the true nature of his job.

Impeller-compressors for G.E. jet engines are machined to partial completion. Those in foreground have had bucket flanges cut.

After smoothing out many bugs in the production engine, the first successful test run of the Whittle-type G. E. engine finally was made on March 18, 1942. The engine was the same in principle as Whittle's, but many small design changes had been incorporated by General Electric's turbine experts to increase the thrust power and to improve efficiency through use of the turbo-supercharger alloys developed during the past two decades (See "Growing Pains for Jet," June issue of AIR FORCE). Although the AAF was still a long way from production, it did have a successful experimental model of a turbo-jet engine for its proposed jet plane.

Meanwhile, Bell had been developing the AAF's first jet airframe, and by October 1, 1942, the XP-59 twin-jet Aracomet had been shipped to a test base in California, the engine installed, and the plane prepared for its first flight. On this date the jet craft flew to a height of 100 feet (AIR FORCE, March, 1944). Other flights were made to high altitudes at high speeds, but as the small power units of this plane limited its performance to that already attained by conventional aircraft, a larger and more powerful engine was developed by G. E. In June, 1944, this new jet unit flew the Lockheed P-80 for the first time and exceeded 500 mph. It was clearly indicated that the AAF now had potentially the fastest fighter plane in the world. Earlier jet models were relegated to the status of training craft.

The basic idea for the gas turbine was not new. A unit that drove its own compressor by means of chains and gears was patented in 1791 by John Barber, and this device was followed by many others. In fact, nearly every thermodynamicist of note had a brainchild or two along these lines—but all were waiting for the development of a material that would run at high enough temperatures to make the cycle pay its way and have something left over as power. In 1884, Sir Charles Parsons devised the first practical steam turbine and also advocated development of the axial flow compressor, which later was built by Brown, Boveri and Company in Switzerland.

It was in 1922 that this country's first official military interest in jet propulsion for aircraft was expressed when the engineering division of the AAF (then Air Service) at McCook Field (predecessor of Wright Field) requested the Bureau of Standards to investigate the practicability of jet. This study, prepared by Edgar Buckingham, and later published by the NACA, concluded that, "propulsion by the reaction of a simple jet cannot compete, in any respect, with air screw propulsion at such flying speeds as are now in prospect." Such flying speeds were envisioned as 250 mph, and computations indicated that at this speed the jet would take about four times as much fuel per thrust horsepower-hour as the air screw.

Accordingly, further investigations were held in abeyance until fuel consumption of such units could be reduced through increased efficiency of jet engines, or until aircraft speeds were increased enough to justify the high rate of fuel consumption. Eight years later, in 1930, Dr. Adolph Meyer of Brown-Boveri built the first modern gas turbine. Although similar in principle to a prime mover, it was designed merely to drive a compressor that supplied air for supercharged combustion of boiler fuel. Many other successful turbos and gas turbines were developed in several countries during the 1930s, and both Britain and Germany had specialists working on them for application to aircraft.

In the United States, we were attempting to solve the basic high-temperature problems of the turbo-supercharger as a prerequisite to successful and efficient development of the gas turbine as a prime mover, and at length alloys with an operating temperature range between 1,300 degrees F. and 1,700 degrees F. were produced. By 1938, Wright Field was able to lay out a five-year jet program with 1944 set as the goal for the perfection of the gas turbine as a substitute for the conventional reciprocating engine in aircraft. As part of the campaign, Eastman Jacobs constructed the NACA "jeep," an engine-compressor-jet combination, at Langley Field, Va. in 1939. This was the first home-designed jet engine to be successfully demonstrated, and it developed a continuous thrust of 600 pounds. Fuel consumption of the laboratory model was five times greater than that of today's jet engines, but experimental tests later proved useful in solving some of the basic problems of burning fuels at high air velocities.

The major contribution of the Whittle engine was that it proved to skeptical engineers in this country that despite low thermal efficiency and high fuel consumption, the total weight of powerplant installation, plus fuel, was low enough to permit the gas turbine's successful use in aircraft. And when the program culminated in the announcement of the P-80 as a combat fighter with more power than any other aircraft, experts were more than ever convinced that a new concept of aerial warfare had been evolved.

Today, the importance of gas turbine developments is fully recognized, and the AAF is changing much of its thinking from horsepower to thrustpower, from carburetors and pistons to compressors and turbines, from propellers to jet. ☆ —By Maj. Robert V. Guelich, AIR FORCE Staff.

Engineer - observers and pilot are briefed by CO before Germany mission.

New advanced airfields were needed almost daily to keep pace with the fast moving European campaign after D-day. . . . The selection of suitable sites by aerial reconnaissance proved to be the answer

Airfield Below

BY T/SGT. BERNARD M. BOGUE
IX Engineer Command

Since long before V-E day, the AAF has been adding up the lessons it learned from the war in Europe. Some operational methods will be discarded; others will be changed to suit our new war plans; and still others, created as a direct result of on the spot combat conditions, will be developed further and used against the Japs. One of the techniques which surely will be brought to bear in the Japanese war is a recently inaugurated method of selecting sites for airfields by the use of aerial reconnaissance.

Just prior to D-day, Lt. Col. Bernard J. Ashwell, R. E., British Liaison Officer of the IX Engineer Command, and Lt. Col. Quinter P. Gerhardt, AAF Liaison Officer of the command, foresaw the limitations of ground reconnaissance in the event of mile-consuming advances across France. They proposed to Brig. Gen. James B. Newman, Jr., commanding general of the command, that aerial reconnaissance be used to survey and select the sites. General Newman approved the plan and the training of an experimental reconnaissance team was begun. It consisted of a pilot familiar with operational airfield problems, and an engineer officer observer with ground reconnaissance experience, familiarity with airfield construction procedure, and map reading ability.

However, before an observation technique could be perfected, D-day had arrived and the aviation-engineers had begun their huge task of providing airfields on the continent. The first strips in Normandy were found by ground teams moving with infantry forces to sites in half-tracks, doing preliminary survey work and sending the information to command, brigade, or regimental headquarters by radio. Then aviation-engineer personnel would be allotted to begin work on suitable sites.

The ground "recce" system was satisfactory as long as the front was fairly stable, since a ground team could inspect two proposed sites a day and cover 36 square miles of virgin territory. In Normandy, however, this system was seriously complicated by the hedgerows which had to be penetrated before a "sight" could be taken of the centerline on a proposed strip.

The experimental air recce team formed by Colonels

P-38 Droop Snoots, which are used on airfield recon missions into enemy territory, gave necessary maneuverability, visibility and speed.

Gerhardt and Ashwell proved its value at field A-13, west of Bayeux in Normandy. The site had been found and checked by the ground team but the air observer discovered that a church steeple obstructed takeoff and landing from the proposed runway. In addition, the air team discovered a better site for an intersecting runway, one that the ground team had been unable to see. The field at A-13 proved that an experienced eye in the air could save a great deal of valuable time and back breaking labor in airfield construction.

Droop Snoot takes off for daylight low-level aerial reconnaissance to appraise military value of enemy-occupied airfields in Germany.

Three L-4's were then ordered by the command. Meanwhile two more aerial recce teams had been formed and given as much training as time allowed. When St. Lo fell, and the Fourth Armored Division swept south to cut the Brest peninsula, the aviation-engineer L-4s were hard at work. In two days' time the light planes covered more than 800 square miles of territory, almost eight times the area that three ground teams could have covered, even if there had been no Normandy hedgerows to hinder them. Four airfields were built on sites located from the air in that area.

Aerial reconnaissance for airfield sites did not displace the ground teams. It helped utilize them more efficiently since it could be determined from the air when a proposed site was unsuitable for development. Ten to fifteen minutes in the air over an unfavorable site was generally enough definitely to reject it. Over a good site, thirty minutes usually sufficed to draw up a sketch of the layout and make an estimate of the controlling grades and the amount of clearance necessary.

During the months of August and September, the three L-4s flew more than 33,000 miles, covered more than 5,000 square miles in reconnaissance, and found 111 different airfield sites. Out of a total of 43 fields built by the command between the 15th of July and the 30th of November, 21 of the fields were selected from the air.

With the drive to the Rhine, aerial airfield reconnaissance came into maturity. The armies were moving so swiftly that the L-4s literally could not keep up with them, and new tactics were needed. The reconnaissance of airfield sites behind our own lines was still SOP. However, the lines were changing quickly, and in many cases, construction work had been slowed by either frozen ground or seas of mud, so that front-line fighter-bomber bases were likely to become rear-echelon stations before their completion. In addition, it was evident that infantry troops would soon be capturing German airdromes that might be used by American planes.

The operations section of the command needed up-to-date information on these German occupied airfields. In what condition were they? How long were the runways? What surfacing did they have? How many, and what type aircraft could they accommodate? What were the opportunities for constructing additional runways? Were the adjacent and entrance roads usable? These questions might have been determined in part by photo-reconnaissance, but time was short as the tactical situation was changing hourly. But engineer-observers and pilots were not anxious to fly over enemy-held fields in L-4s.

A new plane was needed; one that had good visibility, maneuverability, and, especially, speed. The air forces were using a P-38 fitted with a plexi-glass nose instead of guns as a lead ship in Droop Snoot missions. The Lightning was the answer. From its nose compartment, the engineer-observer had unobstructed views straight ahead, beneath, and to the sides. Lt. Gen. Hoyt S. Vandenberg, CG of the 9th Air Force, gave the Engineer Command an A-1 priority on their request for two P-38s.

Aerial Engineer Reconnaissance used the planes to dive into the Luftwaffe's own back yard to see if there were any fields that we might want to use. The procedure was to come over a known German airdrome during the day at between zero and 100-foot altitudes, with an escort of four armed Lightnings. The airfields visited were ones that were expected to fall into American hands in the near future. At the beginning of April, 1945, the "near future" sometimes meant only a few days.

The Droop Snoot sorties were hardly "milk runs" since the engineer-observer needed at least two deck-level passes down the centerline of the field at a constant rate of speed just to determine the length of the landing strip. The Droop Snoot sometimes faced plenty of flak although the passes were made at speeds between 450 and 500 miles an hour. On one such pass, 1st Lt. Edison K. Hamilton estimated that his ship was exposed to more than 2,000 rounds of flak in less than 10 seconds.

The sorties were always made in bright daylight, preferably brilliant sunlight, since shadows quickly indicate the defilades, obstructions, irregularities, and differences in altitudes of the terrain at the field. The important job of getting a good mental picture of the field, calculating statistical data, construction, repair, and demolition possibilities was such that the pilot dared not take evasive action against flak while the observer was getting his information.

Just prior to the campaign inside Germany, General Newman expressed the opinion that the time saved through the use of three aerial reconnaissance teams alone was responsible for at least one additional airfield a week built by the 16 battalions then engaged in construction. An estimate of the time and labor saved during the Germany phase of the campaign has not yet been made. It will be a difficult task to calculate. But the Japs will get little satisfaction from this speedy new method of selecting airfields. ☆

This former Luftwaffe airfield in Germany became P-47 base for 9th Air Force fighter operations ahead of U. S. Ground forces.

Navigating the Pacific

BY CAPT. AL TUDYMAN
Asst. Navigation and Briefing Officer, Hamilton Field

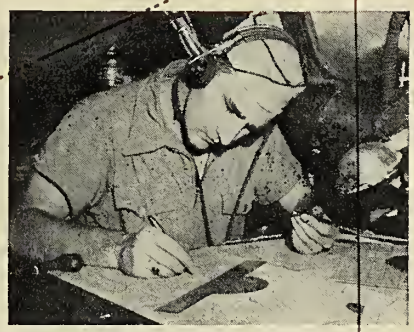
Let's assume you are a hot navigator from the ETO. You split every target right down the middle. The courses you plotted were exact, your calculations precise, your log a masterpiece of double-entry bookkeeping. You brought your flights back through weather, around flak belts and over mountains. Suddenly, the wheels of military necessity turn, and you are assigned to the Pacific.

Navigating across the Pacific, from the States to the Philippines, is not a hazardous assignment. It entails considerable overwater flying and, occasionally, some tricky weather, but 99.99 percent of the flights go through. However, there are precautions you must take, some fundamentals you must relearn, some things you should not forget.

The distance from the West Coast to the Philippines is about 7,000 nautical miles. You will make the flight in easy stages, but you have to be wide awake all the way. For the Pacific is a big ocean, and you can easily get lost.

Here are some of the precautions we suggest to ATC personnel who fly the route from Hamilton Field.

Learn to take three or more star fixes. Don't be satisfied with just two-star shots. At times, celestial calculations may be your only navigational means, and one misplaced star can cause considerable difficulty. It may be true that two-star fixes were satisfactory in your previous experience. But you will not find them satisfactory in flying the Pacific.



Superfort navigator computes an ETA.

Be sure you do not misapply variation. There is a variation swing from minus 18° in the States to minus 12° at Hawaii. One navigator in a B-25 on its way to Hickam was given the variation of minus 18° from his true course, but he applied it positively and flew 36° off-course. When his pilot realized the situation, he asked for a radio bearing, and found that he was 750 miles from Dutch Harbor.

Know your astro-compass so you can determine true headings. Learn the stars en route. Keep a constant eye on the compass. If your compass is wrong by just one degree, you are off-course one mile for every 60 miles you fly.

Use all the navigational facilities at your command—noon fixes, Polaris, landfalls, radio beacons and ranges, electronic devices—everything in the book. Don't be afraid to use the radio when necessary. Some navigators feel that their pilots will think less of them if they fall back on using the radio. Pilots are interested in getting there.

The principal recommendation is—don't fall asleep. And that isn't just gratuitous advice. A navigator going from the States to Hawaii recently took just a one-star fix, then he promptly went to sleep. The winds changed and pushed the plane off-course. The pilot suddenly realized that he was flying at 10,000 feet in the vicinity of 14,000-foot mountains. He got a bearing and brought the plane in. When last seen, the pilot was chasing his navigator the full length of Oahu Island.

Normally, the flight is made in four steps. The first, from the West coast to Hawaii, is 2,100 nautical miles. Four sea-rescue vessels are located about 400 miles apart along this route. Employed as navigational aids and for homing and rescue purposes, they are the only available checkpoints on the first leg of the flight.

The weather is variable. Sometimes you will be unable to shoot a star for as long as six hours. In such cases, you are advised to use surface craft homing facilities, when available, and make constant drift readings if possible. You are encouraged to take double drifts—one every hour and a half is not too often during daytime. At night, smoke bombs which light up like flares can be used for drift calculations providing there is no undercast.

From November until March, icing conditions are prevalent, but you can usually fly below the icing level. It is necessary, however, to receive permission from Oceanic Air Traffic in California before you change your altitude.

Sometimes you will run into a severe buildup of cumulus and cumulo-nimbus. If possible, don't fly through such clouds, for some have dangerous vertical currents and they are of extreme turbulence. At night, if a plane must go through them, it is advisable for the pilot to slow down by pulling back on the throttle. From March to November, there are no unusual weather conditions. Most cloud buildups will be below your flight altitude.

The next jump from Hawaii may be to Kwajalein—a distance of 2,133 nautical miles. Along this route, 713 nautical miles from Hickam Field, is Johnston Island, which may be used in an emergency. This island is only one mile long and one-quarter mile wide. It was necessary to extend the strip beyond the island to accommodate big transport planes.

Here you are near the equator, and you often run into intertropical fronts characterized by a cloud buildup, wind changes and turbulence conditions which require instrument flying by the hour.

Kwajalein is easy to find. It is the world's largest atoll.

From Kwajalein to the Marianas is a flight of about 1,300 nautical miles. There are no island checkpoints. Weather is about the same as that on the previous flight leg.

The 1,200 nautical-mile flight from the Marianas to the Philippines offers no particular navigational problems. Occasionally there are local weather areas which will require good judgment and instrument flying.

Navigating the Pacific is a simple assignment for anyone who pays attention to his work. But, if you get to daydreaming, the hazards of overwater flying may prove too much for you. For the Pacific is a big ocean.

Through years of flying the Pacific, the ATC has assured present and future flights good routes and understanding of potential dangers. All pilots and crew members will admit that flying the Pacific safely depends on the navigator's accuracy and skill and close cooperation of the crew. ☆

Turnabout to Tokyo

Solid Comfort, 8th Air Force B-24 with 57 missions to credit, brings its crew home to Conn. Plane and crew will be redeployed.

On its eighth mission, the Liberator "V Bar" sighted no enemy aircraft, dodged no flak belts, carried no bombs, fired not one round of ammunition. Yet, so far as the feelings of the crew were concerned, this was their most successful mission. The target: home.

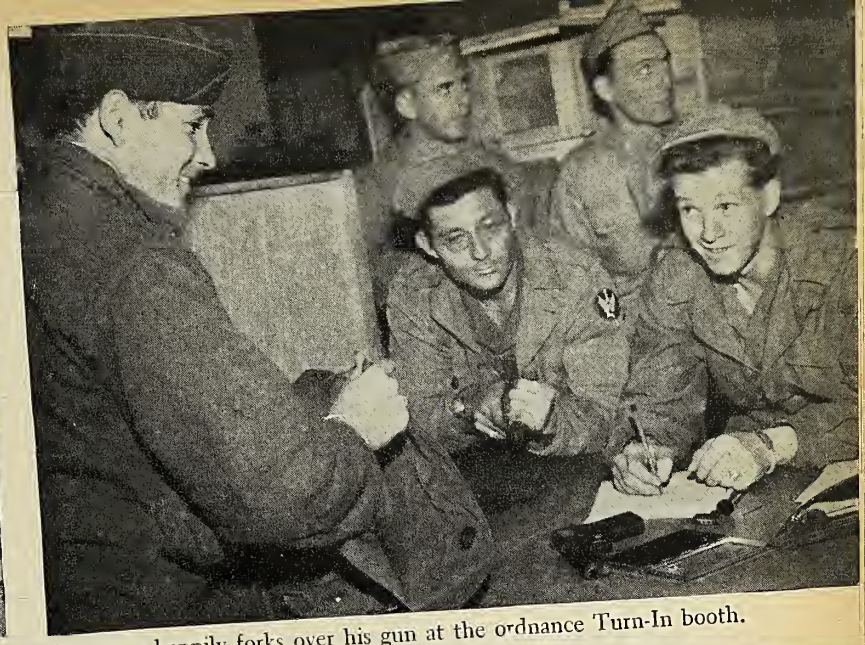
Lt. Gordon H. Kretchmar, pilot, landed his plane at 1142 hours on May 22, 1945, at Bradley Field, Conn. His was the first of 65 planes which arrived that day, and of approximately 3,400 more to follow, in the first redeployment of heavy bombardment units from Europe. Eight hundred enlisted personnel, aircrews and groundmen, and 275 officers —an average of over 16 per plane—came in the first day, all from the 8th or 15th Air Forces. They were jampacked into B-17s and B-24s which had flown the North Atlantic route and made stopovers at Iceland and Newfoundland.

Facilities to greet them were operated with precise military efficiency. Within 20 minutes, the first crew had been processed and was on its way to the mess hall and barracks. Within 24 hours, the entire 1,075 men entrained for the Army Service Forces Staging Area, Camp Miles Standish, Taunton, Mass. From there, they went to the ASF Reception Station nearest their homes, where they received a 30-day leave or furlough, exclusive of travel time. About one-quarter of the planes flew the South Atlantic route, landing at Hunter Field, Savannah, Ga. The men on this flight went to the staging area at Charleston, S. C.

The men returned in aircraft they had used against the enemy. The suitability of the men for combat against the Japanese was the determining factor in their selection for return to the United States. Their planes were flown to Air Technical Service Command depots by the ATC pilots where some of the planes are in the process of reconditioning for eventual disposition by the AAF.

At Bradley, the scene was one of wild enthusiasm. Loud cheers rang out when enlisted Wacs arrived to greet the men and serve as guides. "Order me a dozen," one man said, "they're kinda small." Red Cross ladies served orange juice, coffee and doughnuts, but one gunner demanded, "Is there a cow in the house?" He said he would drink four quarts of milk a day for the next year. A Piper Cub flew over the field and a pilot and copilot both joked about putting in for a transfer to the light planes. The traditional battle between B-17 and B-24 enthusiasts continued. "What beats me," said a navigator, "is that a B-17 passed us 50 miles out of Goose Bay. I can't see 17s passing 24s." Western Union messengers hawked telegrams. "Anywhere

A pat on the ol' U.S.A. terra firma feels good to these men.



Returnee happily forks over his gun at the ordnance Turn-In booth.

BY HERBERT RINGOLD

AIR FORCE *Staff*

For thousands of AAF combat and ground crewmen who participated in this vast aerial troop movement via heavy bombers from Europe, the U. S. was only a brief stopover enroute to the Pacific air war

Fast, efficient system in receiving-hangar enables men to be processed hurriedly. Clothing and equipment are turned in at booths.

in the United States for 31 cents." The men scrutinized the form telegrams and many of them sent one which read, "Home For Good."

But they were not home for good. Upon their return to duty, they went to Central Assembly Stations, then to stations where they began training for very heavy bombers and eventual operations against the Japs. Their leave period was for the purpose of recuperation, rehabilitation and recovery (RRR). It was made perfectly clear that their return to the States was only a way stop. With few exceptions, every man would join the war against Japan as soon as possible.

Another project, to move AAF, AGF and ASF personnel from Europe to the States by ATC planes was underway. Under this plan, ATC will move approximately 50,000 troops per month. Preference is given to those who are sick or wounded and to those who will be demobilized after reaching this country. Eight hundred planes will be used for this purpose.

In Europe, planes of the Troop Carrier Command will transport the men from their stations to aerial ports of embarkation. The ATC will fly them over, using Presque Isle, Me.; Grenier, N. H.; New York City; Wilmington, Del., and Miami, Fla. as the principal landing fields. ☆

Men leave hangar in "Mickey Mouse," converted searchlight van.

Planes of the Far East Air Forces have set up a vast air-sea blockade that has sealed off vital supply lines from the East Indies to Japan's home islands

SMASHING JAP SEA LANES

BY MAJ. THOMAS C. HARDMAN
AIR FORCE Overseas Staff

The colonel walked over to a large wall map of the China coast and stuck a white headed pin in the South China Sea just off Amoy. He studied the map briefly and turned back to his desk.

"That baby won't last long," he commented.

Another Jap freighter, represented by the pin, had ventured into the open sea, and 5th Air Force B-25s already were closing in for the kill. There were other pins in the colonel's map, scores of them. There were pins for ships sunk; others for damaged surface craft; pins showed enemy vessels tied up in harbors, a pin for every Jap vessel in the South China Sea. Every time one of these ships moved, a pin was moved on the colonel's map. The air-sea blockade against enemy movement of vital supplies had reached a stage of near if not complete perfection. The conquest of Luzon had put the stopper in the bottle.

Once our bombers, fighters and patrol planes began operating from Luzon's network of airfields, once the Jap Air Force in the Philippines had been wiped out, our planes were able to turn wholeheartedly to the job of sealing off the home islands of Japan from their primary sources of the raw materials of war in the fabulous Netherlands East Indies, Borneo, Malaya, French Indo-China.

Our aircraft had switched from defensive to offensive sea patrol late in January throughout the Philippines area, but the complete organization of this vast blockade was no simple task. Areas of coverage for the Air Forces had to be defined. A network of almost split-second communications had to be established among Army, Navy and RAAF planes to make the blockade effective.

One development unique in the operations of the 5th and 13th Air Forces grew out of a conference between planning officers of the Far East Air Forces and the 14th Air Force, which took place late in March. A plan was worked out whereby the 5th and 13th would be designated to strike targets along the China coast, enabling many 14th Air Force bombers, which had engaged in this coverage, to concentrate on inland targets where all available air strength was sorely needed to aid Chinese ground forces and blast the way for Allied armies on the march in Burma. Thus the 5th and 13th Air Forces began operating outside their own theater for the first time, except for the 5th's strikes on Formosa, since the beginning of the Luzon campaign.

Results of the new arrangements were not long in coming. On March 28 and 29, B-24s, B-25s and P-38s of the 5th Air Force moved in on a northbound convoy off the Indo-China coast and sent 35,000 tons of shipping to the bottom of the China Sea. The bag included two destroyers, two destroyer escorts, one 11,000-ton tanker and two 6,000-ton tankers. Fourteen enemy planes were shot from the skies, with seven other probables. We lost one P-38.

One account of this action submitted to General George C. Kenney, commanding general of the Allied Air Forces in the Southwest Pacific, pointed out: This strike is indicative of a new phase in our air effort, tactical operations against enemy convoys which provide for complete coordination of search planes and land-based bombers and fighters. Communications between these elements, and shadowing and attack techniques have been worked out and are now operative.

Here's an example, somewhat oversimplified, of how this coordination is effected: A Navy PB4Y search plane spots a convoy moving up the China coast and immediately signals Air Forces Headquarters. Land-based bombers, say B-25s, are dispatched at the opportune moment to take care of the job. The mediums usually have to be pulled off previously assigned missions for such strikes. Meanwhile, the PB4Y is shadowing the convoy, just out of range of antiaircraft guns. When the B-25s near the area, the Navy search plane directs the bombers in for the attack.

Frequently, isolated shipping is hit by day-flying search planes themselves, when the danger of concentrated ack ack or fighter interception is not too great.

Some of the most successful search missions, from the standpoint of shipping sunk, are flown by the jet-black night-searching B-24s of the 63rd Bombardment Squadron of the 5th Air Force's 43rd Group. Flying singly or in pairs and bombing visually as well as with the aid of special equipment, these nighthawks sank 21 ships during the month of March, representing more than 50,000 tons of shipping. Their bombing and strafing runs are made from minimum level. (For details of tactics employed by night bombers, see "Snoopers," March issue of AIR FORCE.)

Planes of the Allied air forces in the Southwest Pacific, scouring the seas from Australia to Shanghai, sank 1,800,000 tons of Jap shipping from January 1 to April 30, not counting probables and possibles, nor scores of unassessable barges and junks. The latter vessels took on greater importance when the Japs began transferring vitally needed cargo to them from larger ships in an effort to sneak through the blockade. Restrictions against bombing and strafing junks have been lifted and instructions issued to sink on sight any junks found outside certain limits off the China coast.

Territories of responsibility for the various components of the Allied air forces engaged in the blockade line up roughly as follows: 5th Air Force, the South China Sea and the Asiatic coast from Saigon to Shanghai, the waters around Luzon and the Formosa Strait; 13th Air Force, South China Sea and French Indo-China coast, along the Malay States and parts of the Netherlands East Indies; the Royal Australian Air Force, the Arafura, Timor and Banda Seas, East Indies areas and north around Borneo. The territories as defined are purposefully flexible so that any air component is able at all times to combine power with another.

With the high perfection of the air blockade technique, the famed battle of the Bismarck Sea has its China Sea

Flames roar up from Jap tanker loaded with vitally needed aviation gasoline, after B-25s score direct hits at Mako on April 4.

Two Mitchells churn the water with hits and near misses on a Jap vessel during the March 29 attack which cost the Japs 9 ships.

counterpart almost every day. In most instances, the convoys are not as large as the 22-ship concentration that was blasted off the New Guinea coast in March of 1943, but the frequency of "grand slam" strikes against them provides the parallel. The reports come in with almost monotonous regularity. A flight of B-25s is led by a Navy searchplane under the operational control of the 5th Air Force to a convoy of two destroyer escorts and three freighters. The result: One 6,000-ton freighter and one destroyer sunk, one 8,000-ton freighter and one 6,000-ton freighter left burning and sinking, the remaining destroyer afire and claimed heavily damaged. Fourteen 13th Air Force B-24s sink or damage nine Jap ships in the Makassar Strait, including two destroyers, five cargo vessels and two schooners. B-24s sink or damage 21 vessels in Parepare Harbor, Celebes.

Except for low level strikes by night flying heavies, B-24

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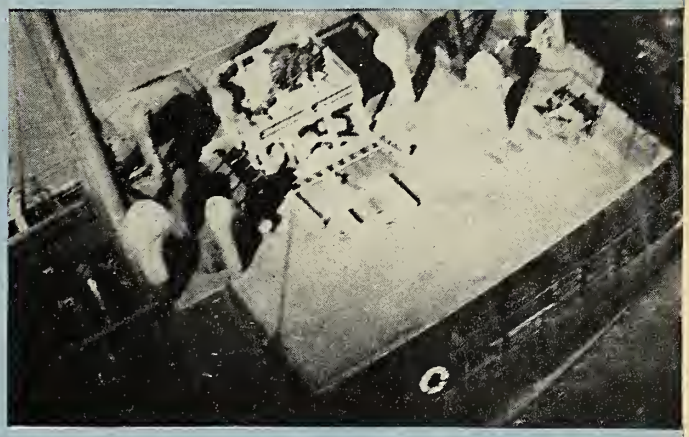
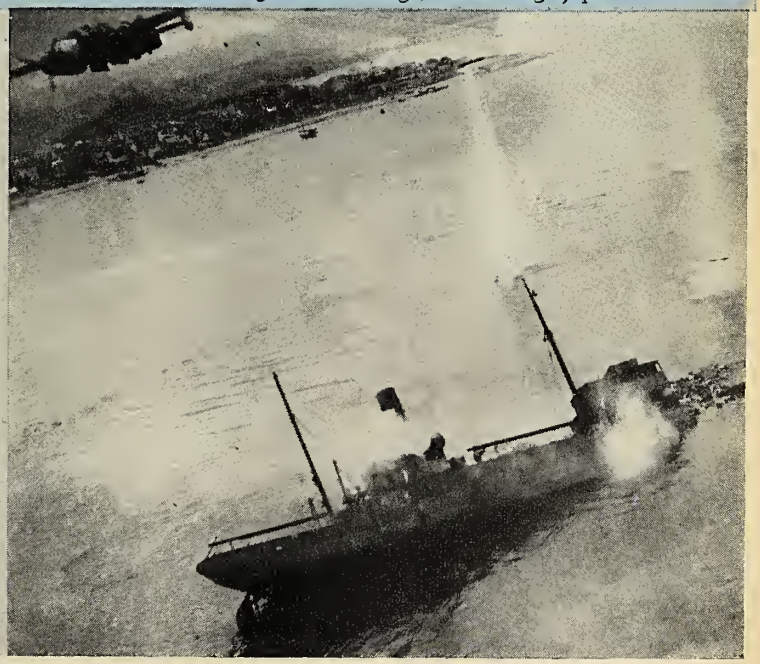


Attacking plane swoops so low over Jap freighter that photo-interpreters identified gun mounted aft as infantry 75 mm field piece.

This dead duck was caught in the South China Sea by 345th Group B-25s which fly daily patrols along this Nip shipping lane. ←→ **Ten minutes later,** freighter at left is listing to port, its bow and forecastle submerged. Wreckage, swimming Japs littered area.



attacks are made principally from 10,000 to 12,000 feet on shipping in coastal harbors, since antiaircraft installations around dock areas are still sufficiently businesslike to warrant fairly high altitude runs.

Acquisition of Philippine bases permits our medium bombers and fighters access also to ships in China ports as well as in the open sea, despite the fact that on many strikes these planes have to fly as much as 600 miles to reach their targets.

B-25s with their devastating forward fire and mast high bombing techniques have been particularly successful. Generally, the 25s strike each ship in pairs, moving in from different directions simultaneously. The firepower of their eight .50 caliber nose guns either knocks out the antiaircraft or takes care of the gun crews on the first pass to make subsequent bomb runs a little more comfortable for the aircrew members. As many ships in a convoy as possible are attacked at the same time to avoid concentration of antiaircraft fire. The initial strafing runs usually are made lengthwise of the vessel in order to rake the entire deck; then the bomb runs are made broadside to straddle the ship with explosives. In most instances, 500-pounders are used with a four-to-five-second fuze delay.

Fighters have come in for their share of credit in the blockade, although the sea lane job is primarily that of the bombers. Occasionally, fighters employed as escort for heavies striking harbor areas get a chance to expend some ammunition by strafing coastal vessels. Others, carrying a couple of bombs, have blasted dock areas, airdromes and harbor shipping all along the Asiatic coast, particularly in the Saigon area. The first 5th Air Force strike on ships in the Hong Kong harbor, which took place early in April, gave the fighter boys an opportunity to get in a few licks. While the B-24s blasted the harbor with only negligible fighter opposition, some of the escorting P-38s struck a body blow against airfields on Hainan and along the south China and Indo-China coasts.

In mid-April, when it became evident that shipping by sea was getting them nowhere, the Japs made a desperate attempt to open the entire rail line from Indo-China through the China interior to the north so they could obtain at least a trickle of supplies via the land route. Our airpower again cramped their plans, this time with regular strikes on railroads and bridges by bombers of the 10th and 14th Air Forces and Superfortresses of the 20th Bomber Command.

Early in May, bombers and fighters of the 5th and 13th Air Forces, and Navy patrol squadrons under their control began taking a hand in cutting lines of communications inside the coast from Singapore to Shanghai; meanwhile, the noose on sea shipping was getting tighter and tighter. On April 16, the normally busy ports at Wenchow, Foochow and Amoy were empty of enemy ships. On the following day, at least three other ports were added to the list. Later came Saigon and Phanrang in Indo-China, Youlin Bay and Hoihow harbor on Hainan, Hong Kong, Swatow, Shanghai, Make harbor in the Pescaderes Islands, and Takao, Toshien and Kaiirun on Formosa.

The vessels venturing into these harbors were being blasted by the heavies; those preferring to make a run for it were falling prey to the mediums. Jap ship captains obviously were struggling with indecision. Blocked from the north, from the south and threatened day and night from the middle, many of the skippers began running aimlessly out to sea for the relative safety of motion. But the pins on the map moved when they moved. Their destruction was inevitable, and without their cargo the Jap military machine was grinding slowly to a stop. ☆

REDEPLOYMENT IN THE AAF

(Continued from Page 6)

sidered for relief from active duty in the AAF in order to work for a civil airline?

A limited number of officers and flight officer pilots who have completed overseas tours in combat theaters or participated in overseas operations of the ATC will be eligible to apply for consideration. They must have been in the United States for six months before making their application. Acceptance will depend upon whether they can be spared by the AAF and whether they prove acceptable to an airline engaged in operations essential to the prosecution of the war.

8. *Will the reception centers for redeployed personnel resemble the redistribution stations to which AAF returnees have been sent by the Personnel Distribution Command?*

There is no connection and no resemblance between the two. A reception station in the redeployment system is primarily designed to control and speed military movement; personnel will normally stay at such a center no longer than two days. Redistribution stations, on the other hand, are primarily for classification and reassignment; some have extensive facilities for rest and recuperation.

9. *During the redeployment period, what are the opportunities for entering flying training?*

The aviation cadet program has been sharply curtailed. Men now in flying training can fill current needs. Personnel experienced in combat, however, will be given priority in later selections.

10. *Will men assigned to duty in the United States after a tour of duty overseas be given their choice of stations? Can they be assigned near their own homes?*

These two questions usually come together, but they are very different propositions. It is obviously impossible to give all returnees their choice of stations. On the other hand, it has been the policy of the AAF since April to assign returned enlisted ground personnel as near their own homes as possible. In this way, those eligible for release in the near future will be close to their separation centers near their homes.

11. *Can personnel assigned to the Occupation Air Force bring dependents to Europe?*

Because of shortages in transportation, food, and housing facilities, the policy of the War Department for the time being prohibits dependents of Army personnel from joining husbands and relatives overseas. When two members of a family are assigned to the same theater, the reason will be military necessity and not family relationship.

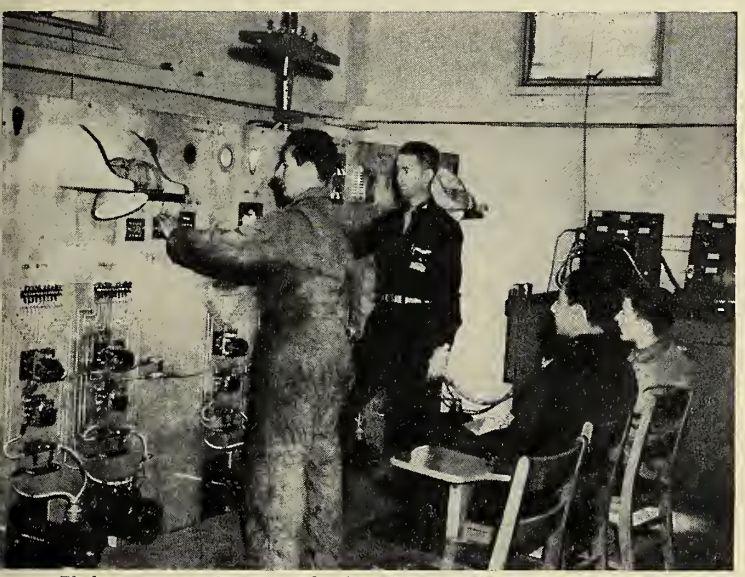
12. *How does demobilization in the AAF compare with the general plan announced by the War Department?*

The AAF will demobilize the same percentage of its strength as the rest of the Army. The process in the AAF will be somewhat slower than that in the Ground Forces. Later, additions to the AAF from Selective Service and transfers of surplus personnel from the other main forces will balance the AAF's rate of demobilization. In other words, as the program levels off, there will be no inequalities among the major forces of the Army. Criteria for release are uniform throughout the service; the Adjusted Service Rating card and the point system are identical. Like all other phases of the armed forces' joint effort, redeployment and demobilization are keyed not to celebration of victory in Europe but the establishment of peace through the defeat of Japan. ☆

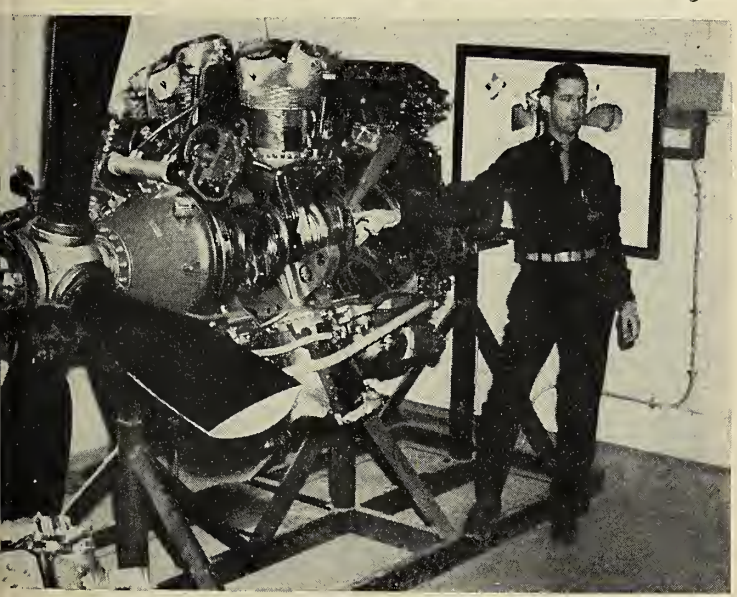
B-29 Flight Engineer

T/Sgt. Lynn Kelley is B-29 flight engineer who completed 51 missions as engineer on B-17 before he was trained to handle B-29s.

He's the boss of fuel consumption, a vital factor on roundtrip hops of 3,000 miles and more



Elaborate mock-up teaches intricacies of generator system which supplies current for operating the landing gear, wing flaps, bomb bay doors, cowl flaps, inverters, and interior and exterior lights.



Instructor at Smoky Hill's flight engineer school explains the internal mechanism of the 3,350 engine and the Hamilton propeller.

Capt. J. V. Norton, a wing flight engineer with the 21st Bomber Command, suggests that being a B-29 flight engineer is more like having a profession than a trade.

"The flight engineer," Norton explains, "governs the efficiency formula prescribed for the B-29. He must know the right combination of operating variables to obtain optimum performance for any given condition of flight. In combat we require only one optimum — most miles per gallon. The greater fuel economy we achieve, the greater bomb load we can carry."

Why, then, haven't there always been flight engineers on bombers? The answer is in the type of mission flown by the B-29. In the old days, you just loaded up an airplane with gas and flew it at a constant airspeed. But Japan was a round trip of some 3,000 miles from bases in the Marianas. There were problems of changing weather, winds, climate. Even more important, there was the problem of changes in gross weight during flight.

The job called for men with good theoretical as well as practical engineering background. Pan American Airways learned that a long time ago when it put its Clippers into long range operation. There was a flight engineer on the early Catalinas, the Boeing 307 and 314. The B-19, the Constellation and the Navy Mars carry flight engineers. All these, like the B-29, were designed to carry heavy loads for long distances.

As Captain Norton puts it, the only difference between the commercial airlines and the 20th Air Force is in the ultimate objective. The airlines figure in terms of dollar profit per mile. Combat aircraft must figure in terms of bomb pounds per mile. Being an engineer, Captain Norton promptly created an equation. The efficiency of a bomber command equals bombing accuracy times weight of bombs, divided by operating cost in fuel.

"The flight engineer," said Captain Norton, "isn't only

(Continued on Page 61)

Geared to the air war, research laboratories of NACA have found the answers to many basic problems facing America's aircraft designers and engineers

BY MAJ. ROBERT V. GUELICH
AIR FORCE *Staff*

The AAF and aircraft manufacturers and engine designers have taken many of their troubles to the National Advisory Committee for Aeronautics. Almost invariably, they have come away with recommendations that have contributed to the solution of specific problems hampering performance of our warplanes.

The problems have included "hot cylinders" in the B-29, icing carburetors in the C-46; the contributions have included compressibility flaps for the P-38, improved bomb bay doors for the B-24, to mention a few.

Trouble-shooting such as this, however, is a wartime by-product of NACA, whose primary business is basic scientific research. It was set up as a civilian agency by Congress the year after the outbreak of the first World War "to supervise and direct the scientific study of problems of flight with a view to their practical solution."

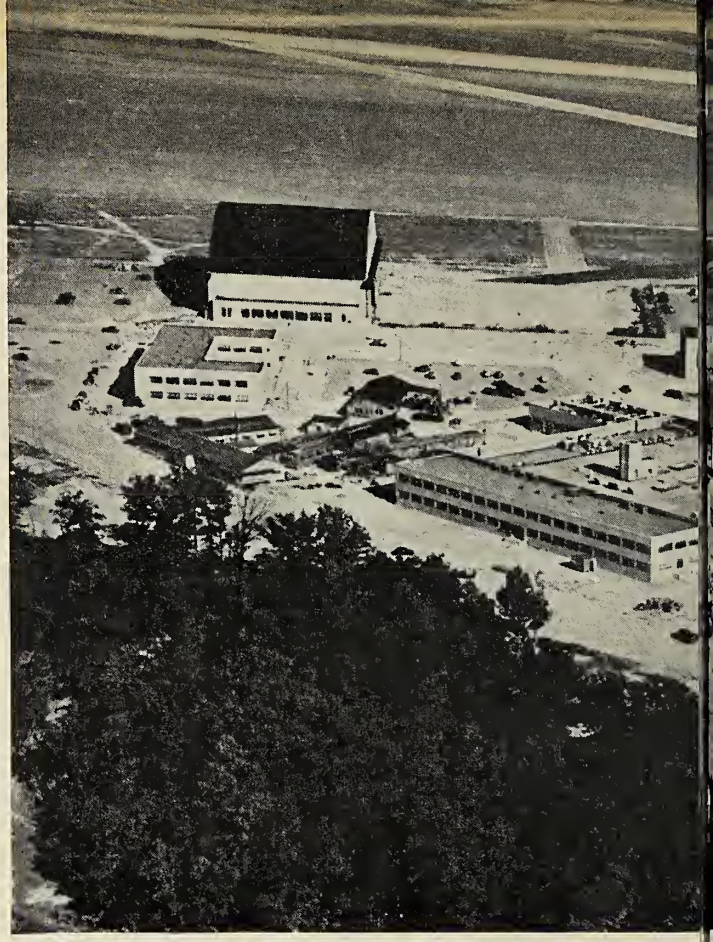
The agency has been a leader in debunking the idea that the only way to increase the speed of aircraft is by increasing horsepower. Through three decades of research, NACA has increased the speed of every type of airplane being used by the Army, Navy and commercial airlines. This research work also has extended the range of our aircraft without correspondingly increasing the rate of fuel consumption.

The XP-39, for instance, had its top speed boosted from an original 326 mph to 402 mph, although this speed later was sacrificed to incorporate necessary military modifications. The XP-41 was flying at 309 mph when NACA engineers scientifically bent a few exhaust stacks, put the hot gases to work as jet thrust, and upped the speed to 327 mph. Air-cooled engines were limited in horsepower output by the critical temperatures of cylinder heads; NACA made several recommendations to improve cooling of these engines with the result that more horsepower was obtained from the same engines.

Because of these contributions, the AAF was able to perfect the P-63, now obtains jet thrust augmentation from the exhaust stacks of Merlin and Allison engines, and gets more horsepower from all military air-cooled engines.

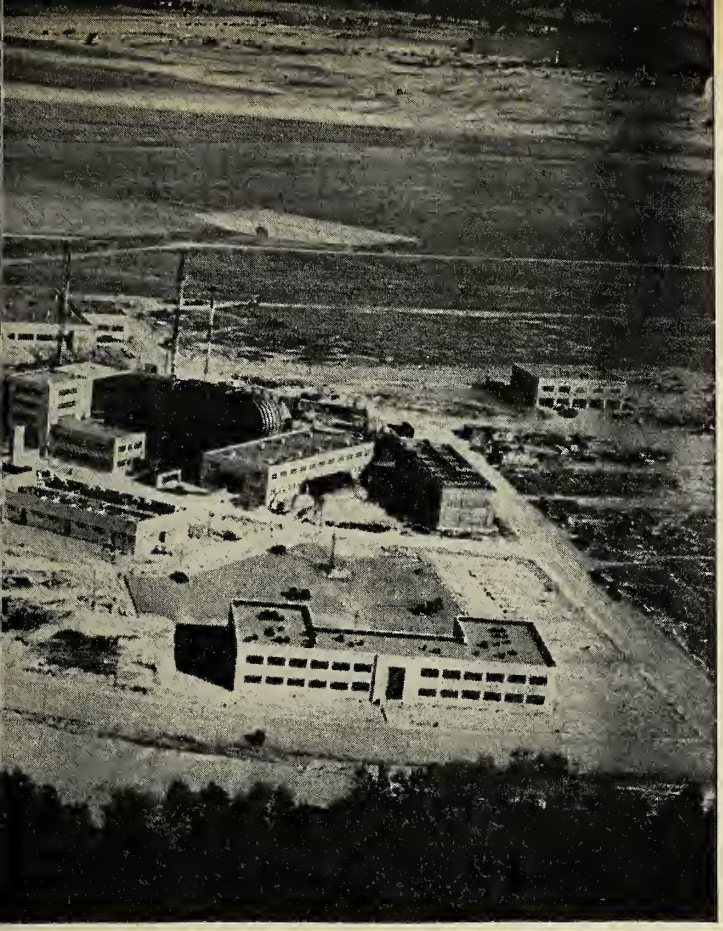
NACA carries on its research in its laboratories and wind tunnels at the Army's Langley Field, Va., the Navy's Moffett Field, Calif., and the Cleveland Municipal Airport, where the nation's best equipped aircraft engine research laboratory now is operating.

Today the organization employs 6,500 people and operates with an annual budget of $26,000,000. In addition to its own facilities, NACA works closely with the aircraft manufacturers, the Army's experimental division at Wright Field, the Navy's Bureau of Aeronautics, and regularly contracts research work out to technical schools, universities and specialized research organizations.



View of NACA Aircraft Engine Research Laboratory, adjacent to M

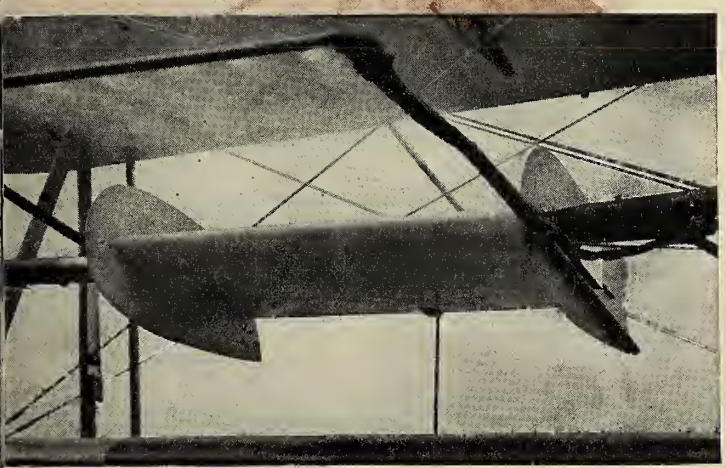
Experiments with scaled models form a large part of NACA's work. An engineer prepares to measure air-speed behind dual propellers.



pal Airport, Cleveland. Hangar at left has 40,000 sq. ft. floor space.

U.S. Airpower

DRAWING BY LT. BERTRAND MANGEL



A model airfoil is installed to examine results achieved through the use of engine exhaust to prevent the formation of wing ice.

The early days of the agency were meager ones, however. Established in the spring of 1915, the original appropriation to launch NACA was "$5,000 a year for five years, or so much thereof as may be necessary." Eighty-five thousand dollars was appropriated a year later to start the first research laboratory at Langley Field. In the years immediately following World War I, appropriations for aeronautical research were so lean that the NACA had to hire civil service employees to erect its first engine dynamometer laboratory.

Despite its monetary hardships, the organization was successful in enlisting some of the best technical minds in the nation. Before the end of World War I, the NACA had set up the design requirements and stimulated production of the Liberty engine, most notable American contribution to aviation of the period.

In 1923, NACA published conclusions of the first investigation of jet propulsion for aircraft in this country. Until planes could be built to withstand far greater speeds, it was concluded that the jet propulsion could not be regarded as practical because of its inefficiency at low speeds. This study was revived in 1939, and led to the first successful demonstration in December, 1941, of an American-built jet propulsion engine.

It was during the two decades of peace-time research between World Wars that NACA assembled evidence to prove there is a difference between the science of aeronautics and ground-bound mechanical engineering. In general, to increase appreciably speed of an automobile, a ship, or a train, you can only increase horsepower and improve roadways. To increase speed of an airplane, you can, instead, remove protuberances and smooth out angular joints that interfere with perfect airflow and increase drag. Thus, by concentrating its wind tunnel tests on the reduction of drag, NACA was successful in jumping top speed of particular types of early aircraft as much as 50 mph.

During the 1920s, pilots sighted between their engine cylinders when shooting landings. Consequently, they didn't favor blanking out this vision by enclosing the engine in a cowling, even if NACA did have figures to prove that speed could be greatly increased. A compromise method was to use a metal band, known as the Townend Ring, around the perimeter of radial engines.

Glenn L. Martin, who put all of his faith and money in a new twin-engine bomber for the Army, used the Townend ring around the engines as standard equipment. The plane had a satisfactory topspeed of 190 mph, but the Army turned it down because the landing speed of 95 mph was too fast. This trouble was remedied by using the recently developed NACA cowling on the new NACA nacelle location within the wing, which utilized the lift of the wing behind the engine instead of destroying it.

Martin made this simple change and took his plane back to the Army for test. The top speed was jumped to 225 mph, even faster than any fighter of that day, and the landing speed was reduced to 65 mph. The Army bought the plane, designated it the B-10, and the Collier Trophy was awarded to Martin for the greatest achievement in aviation for the year 1932. This airplane did, in fact, revolutionize military aviation concepts.

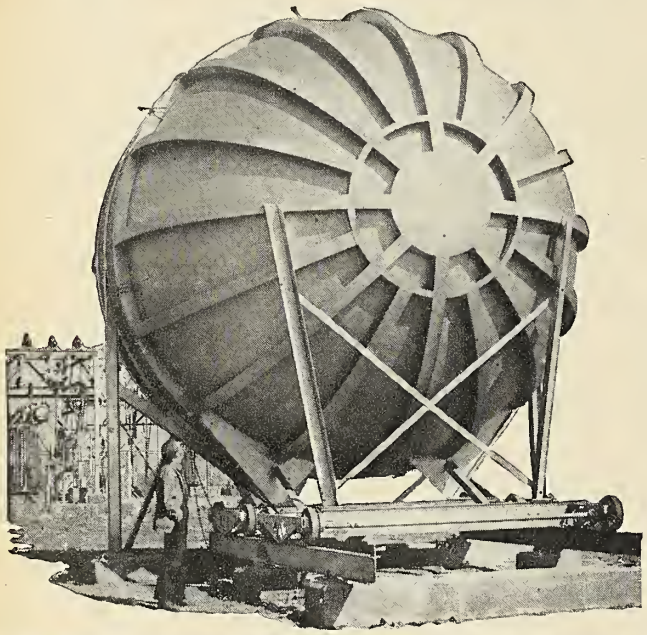
Today, the NACA cowling is used on all planes with air-cooled radial engines except those in the light-plane, slow-speed class.

After developing many original designs of airfoils, NACA developed a high-speed airfoil principle which was first used by North American on the P-51 wing. This airfoil delays the compressibility "burble" by moving back the shock-wave formation point. With it, laminar flow may be maintained

at high speeds over the first 60 percent of the wing instead of only the first 30 percent. With this type of airfoil, the P-51 has been flown in high-speed dives well over 600 mph before encountering serious compressibility effects.

In the field of compressibility, NACA first discovered and photographed this phenomenon in laboratory tests 12 years ago and has accumulated more scientific information about it than any other military or civilian organization in this country. The compressibility dive flaps on the P-38 and on a new Douglas plane were developed by Lockheed and Douglas engineers on the basis of NACA high-speed wind tunnel tests.

In its cities of wind tunnels, the NACA not only has tackled the problems of high-speed airfoils and drag reduc-



In the Ames Aeronautical Laboratory, a part of NACA's branch at Moffet Field, California, a 16-foot wind tunnel obtains test data.

tion, but also has devoted thousands of hours of research and testing to improve controllability and stability of our aircraft. Every new type of plane goes through the spin tunnel and is modified so it can be pulled out with safety. Controls are investigated to determine their effectiveness. Propellers, engines and coolant ducts are exposed to severe icing conditions in the nation's only icing tunnel.

Although the mission of NACA is to conduct basic scientific research, the pressure of war has compelled the use of many of its facilities to help eliminate bugs in military equipment.

When all of our forces in China were dependent on the Aerial life-line over the Hump from India, C-46 Commandos were being flown to Assam direct from production lines to replace and augment the force of war-weary B-24s and the tired C-47s that had opened up this difficult supply route. Last summer's monsoon weather brought drenched air and real trouble for C-46 pilots. They could get through the turbulent storms all right if they didn't lose an engine from carburetor icing, but too many carburetors were icing up in the saturated air.

When enough evidence was gathered to indicate the trouble might be localized in the air scoop, this urgent problem was given to NACA. In their new icing wind tunnel at Cleveland, a C-46 nacelle was exposed to 200-mile an hour icy winds laden with humidity. Ice quickly formed in the scoop and in the induction system. Design engineers analyzed the airflow, redesigned the scoop, built drainage vents into it, and eliminated the most troublesome cause of carburetor icing. Their recommendations immediately were forwarded to the AAF and to the manufacturer, so that modification kits could be sent to CBI to remedy the trouble on planes already there, and the change could be incorporated on production line aircraft.

No sooner had the world's first refrigerated high-altitude engine wind tunnel been completed at the new Engine Research Lab than the AAF called for special tests on B-29 engines, which had been hindering performance of the plane by overheating. Carefully instrumented tests were run and remedial measures were tried with the result that some of the NACA recommendations contributed to the solution of the "hot cylinder" problem and accelerated effective use of the Superfortresses against the Japanese homeland.

As soon as this engine was taken out of the wind tunnel, the Army had a priority investigation scheduled on the turbo-jet engine of the P-59. Tests showed some of the ducting could be improved, so changes were made to increase its efficiency. Then, an even hotter project, the jet propelled P-80, was shipped in for a series of gruelling performance tests at extreme speeds and altitudes in the high-altitude wind tunnel.

Whenever possible, however, maintenance and production bugs are smoothed out in the laboratories of Wright Field for the AAF; only when scientific research is needed to iron out a problem, or when Army facilities are inadequate, or are jammed with other projects, is NACA called upon for assistance. But, in time of war, there are too many projects for existing military test facilities so most of the capacity of NACA is absorbed by military projects, forcing postponement of NACA long-term research work.

Although the NACA jet engine of 1941 was temporarily dropped when the military requirements for the Whittle-type high-speed, relatively short-range engine were given priority, many of the techniques developed to evaluate the performance of this engine now are being adapted for evaluation on other types of jet engines.

The NACA jet unit, developed by Eastman Jacobs, was designed for long range as well as high speed. It drove a compressor fan from a conventional 1,000 hp radial engine; air from the compressor was ducted to a combustion chamber with 59 fuel atomizer nozzles; as the fuel-air mixture was burned, the hot gases were exhausted through a tail pipe, augmenting the thrust of the compressor fan by 100 percent. Net thrust attained in early tests was 600 pounds, considerably less than that which now is obtained from present jet units.

As has been the case with many research projects, NACA did not develop the specific design we are using today, but its engineers did establish many of the principles that are influencing the general design and determining performance of the various types of jet engines now under consideration. NACA officials are among the first to disclaim exclusive credit for their contributions. It is their policy to lead the way in fundamental research on new aeronautical problems, to assist others in their developments and to conduct high priority tests on experimental aircraft and components.

In its quiet, scientific way, the NACA is working 24 hours a day on high priority Army and Navy projects. For this reason, much of its work during the last few years has been hidden under the barrel of military security. Other phases of its long-range research programs on jet and rocket fuels, on guided missiles and supersonic aircraft will continue to be kept from the public eye for years to come. But many of the agency's achievements already have aided our planes in gaining aerial superiority in this war. ☆

CHINA CHECKERBOARD

A review of the China war and its relationship to the activities of the 14th Air Force

War in China has been full of contradictions. One of the strangest is that during all the recent months, when China stood at bay, the 14th Air Force never went on the defensive. This paradox has no relation to the sort of thing that General Dittmar used to call the Wehrmacht's "advances to the rear." Although the 14th was compelled to destroy a dozen or so of its own airfields, 90 percent of all the missions that Maj. Gen. Claire L. Chennault's men flew were straight offense.

In pounding out this contradiction, the 14th presented the Japanese with a grim bit of irony. Although the Japs accomplished more than one of their prime objectives in the campaign that began in 1944, their most important drive did not pay off.

With defeat coming at them from the Pacific by water and by air, the Japanese started their campaign in China last year from three large areas—the Yellow River bend, the Yangtze bulge and the Canton-Hong Kong section. Their immediate purpose was to establish an overland route from North China to French Indo-China. They also intended to eliminate those 14th Air Force bases which threatened Jap land and water transportation in the southeast and to discourage Allied landings on the China coast by filling out their conquest of Southeast China. Defeating the Chinese Army and discrediting the Central Government were parts of the ultimate plan.

In April, 1944, the Jap drive began in earnest. Moving south of the Yellow River, the Japanese occupied the Pinghan railway zone, north and south, and part of the Lunghai railway, east and west. Before two months had passed, they were counting on a north-south corridor. On May 26, Japanese divisions in the Tungting Lake area began an offensive against Changsha and Hengyang, south of Jap-held Hankow. The defense of Hengyang by the Chinese 10th Army and attempts by other armies to come to its relief were heroic but tragically expensive actions. The Japanese also paid a tremendous toll. Whenever they massed for siege of a fixed point, the 14th Air Force went after them. They soon learned not to mass for sieges. Wherever the 14th spotted troops or supplies in motion or holed up, they attaeked and so forced the enemy to move in the dark. Still the Japs kept coming against Hengyang, which fell early in August.

By September further drives southwest had begun. Many Chinese points were by-passed. The American base at Lingling fell. As the Japanese regrouped their forces and jabbed out southwest of Hengyang and Lingling, they also began to drive west from the Canton-Hong Kong area. Liuchow was threatened; so was Nanning. First the Chinese spread out to meet the attacks; then they brought a desperate concentration into Kweiping. Here the 14th delivered one of its most powerful blows, but the Chinese were unable to turn the ground tide.

November was a black month on the road to Tonkin. Kweilin fell on November 10. The next day, Liuchow. In less than two weeks, Nanning was gone. The 14th had already crossed off its map airfields at Hengyang, Paoching, Lingling, and Tanchuk.

Fighting from centers around Liuchow, the Japs continued to smash out at Chinese troops and transports. They caused gigantic damage. Finally, near Kweiyang — only about 200 miles from Chungking — the Chinese stood. Deepening winter and extended supply lines, together with the prospect of a fight for a fixed position, caused the Japanese to pull back. The Chinese, however, did not have the forces to rout the retreating columns.

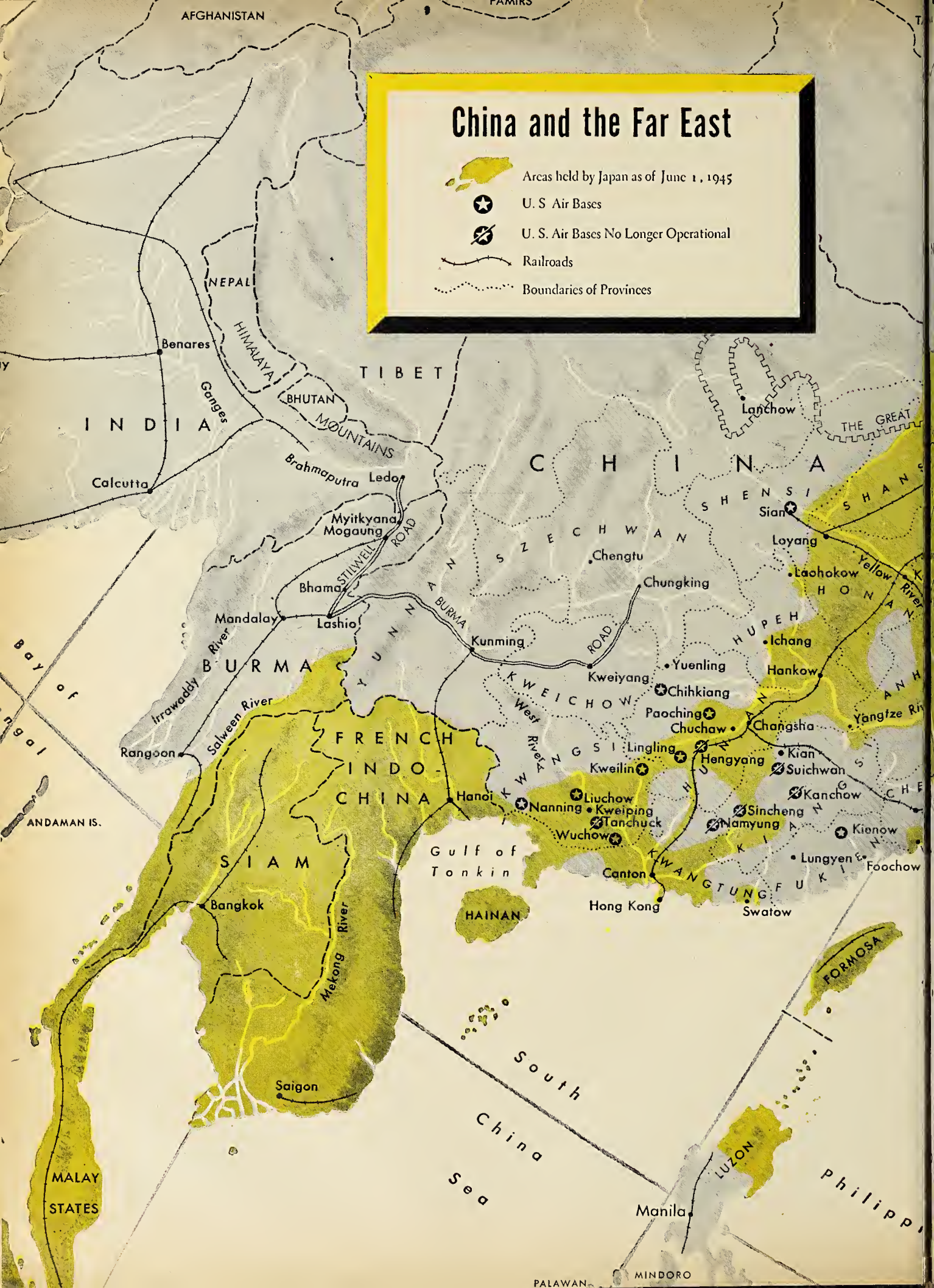
As 1945 began, the Japanese had massed several hundred thousand men south of the Yangtze. They already had the making of the projected corridor from North China to French Indo-China. They had isolated whole sections of China from overland supply; they had ground some Chinese units to bits and sapped the strength of others. With forces concentrated in areas north of the West River, east of Kweilin, and about Hengyang, they might expect to put the Canton-Hankow railway into full operation, and move against such 14th Air Force bases as those at Suichwan, Kanchow, and Chihkiang.

Regrouped Jap forces reached Suichwan by the end of January. Earlier, about the middle of the month, the Japanese had started their long-expected offensive to clear the Canton-Hankow corridor. In 10 days they broke loose along a 200-mile front and pushed their infantry and cavalry 100 miles, often in contempt of terrain which would be marked "impassable" on anybody's map. Once more the 14th erased names from its list of bases—Namyung, Hsincheng, Kanchow—and, for a time, Suichwan.

The Japanese propagandists were making sounds of joy. Here was a good chance of supplying and reinforcing the Canton-Hong Kong area by land. The 14th Air Force's threat to shipping along the China coast had been curtailed; so had the possibility of its cooperation with invasion forces. The effectiveness of the Chinese Army had been reduced. Weren't Japs swirling up and down the areas between Hengyang and Canton, about Suichwan, and between Canton and Swatow? At the same time, forces were massing solidly at widely separated points in the Shanghai region and in French Indo-China. In the latter area the Japanese had taken over French garrisons and disarmed the troops early in March.

Meanwhile, the 14th Air Force was not limited to blowing up airfields so that the Jap advance would be robbed of profit. Off and on, January and February produced miserable weather; but whenever a break came—and in March there was an especially good one—the 14th proceeded to set new records for assault. During the spring, this got to be a habit. Given a few clear days, the fighters and bombers would ring up another high for total missions.

The Japanese campaign in Southeast China having made the 14th's attack on the sea lanes impractical, General Chennault had concentrated his offensive up north, where vital Jap supply lines ran by road and river. Shanghai and the Yangtze were attacked by deeply penetrating aircraft. Forthwith, the Japs began to pound at the 14th's North China bases. In the last week of March, advancing ground forces compelled the Americans to abandon the field at Laohokou. But the old Jap plan had changed. Whereas in


China and the Far East
Areas held by Japan as of June 1, 1945
U. S Air Bases
U. S. Air Bases No Longer Operational
Railroads
Boundaries of Provinces
AFGHANISTAN
PAMIRS
NEPAL
HIMALAYA
Benares
Ganges
INDIA
BHUTAN
MOUNTAINS
TIBET
Brahmaputra
Ledo
Calcutta
Myitkyana
Mogaung
STILWELL ROAD
Bhamo
Mandalay
Lashio
BURMA ROAD
Irrawaddy River
Salween River
Bay of Bengal
BURMA
Rangoon
ANDAMAN IS.
FRENCH INDO-CHINA
Hanoi
SIAM
Bangkok
Mekong River
Saigon
MALAY STATES
Gulf of Tonkin
HAINAN
South China Sea
Lanchow
THE GREAT
CHINA
SHENSI
Sian
Loyang
Yellow River
SZECHWAN
Chengtu
Chungking
Laohokow
HONAN
HUPEH
Ichang
Hankow
Yangtze River
Kunming
Yuenling
Kweiyang
Chihkiang
KWEICHOW
West River
Paoching
Chuchaw
Changsha
KWANGSI
Lingling
Hengyang
Kian
Suichwan
Kweilin
Liuchow
Nanning
Kweiping
Tanchuck
Wuchow
Kanchow
Sincheng
Namyung
Kienow
Lungyen
Foochow
Canton
Hong Kong
KWANGTUNG
FUKIEN
Swatow
FORMOSA
LUZON
Manila
Philippi
MINDORO
PALAWAN

ARCTIC SIBERIA
U S S R
NGOLIA
Amur River
MANCHUKUO
Harbin
Tientsin
Mukden
Dairen
KOREA
SHANTUNG PEN.
Tsingtao
Yellow Sea
Shanghai
Fusan
FAR EASTERN SIBERIA
SAKHALIN (Sov. Un.)
KARAFUTO (Jap.)
Vladivostok
Sea of Okhotsk
PARAMUSHIRO
Sapporo
HOKKAIDO
Sea of Japan
Aomori
Sendai
HONSHU
Nagasaki
Kobe
Kyoto
SHIKOKU
Osaka
Nagoya
Yokohama
Tokyo
KYUSHU
Kagoshima
East China Sea
JAPAN
IZU SHICHITO
RYUKYU IS.
OKINAWA
BONIN IS.
IWO JIMA
VOLCANO IS.
MARIANAS
N

1944 their attaeks along the Pinghan and Lunghai railways had been offensive, the purpose of Jap operations in Honan was now elearly defense. To proteet their transportation they had to take great risks.

As for the Allies, the late spring brought several blunt questions. Would the Chinese be able to hold on the ground? Would weather permit General Chennault's flyers to keep their vertieal warfare in high gear? How would the Japs reaet to the threat from the Paeifie?

The answers eame in short order. The Chinese did hold. At numerous points, on the eoast, around Nanning, and in the north they made the Japs miserable by eounter-attaek. Off and on, there was good weather; the first week in April the 14th used it to break the total-mission reeord again, and repeated in the third week. Where the 14th had left off bombing the shipping lanes between Shanghai and Indo-China, the Far East Air Forees took up with a vengeanee. In Burma, too, the 10th Air Foree was giving the Japanese a war. And no Jap eould be expeeted to look happily at events in Tokyo, Nagoya, and the Philippines.

In May, the Japanese lowered their sights in Honan. Toward the southeast, they were obviously uneasy. On many an inland route, the 14th Air Foree hawked and harried their military traffie. When Peiping-Hankow trains ran at all, they ran irregularly. The road from Canton to Hankow was still largely a plan. As General Chennault put it, "The Japanese eorridor from Manehuria to Malaya has turned into a dream pipeline."

There was a touch of Oriental eourtesy in General Chennault's not ealling the dream a nightmare. During more than a year of the Jap drives, his fighters' eombat seore against the Japanese Air Foree had been more than seven to one, with a three-year average of five to one. Monthly tonnage over the Hump had greatly inereased. In the earlier period, bombers of the 14th had ranged the waters between Formosa and the mainland. They had paid damaging visits up and down the hinterland, along the eoast, and into Burma. Their photo units had pointed lenses at the entire eoast and mueh of the interior. The 14th's transports had erisserossed a theater larger than Western Europe, sometimes in sudden and diffieult emergeney, often on regular runs whieh were dangerous enough to put routine air supply missions into the "eombat flying" eolumn. The 14th had had no "typieal target." They had hit whatever needed hitting—a town, a eompound, an airdrome. They had put loeomotives or whole trains out of aetion, destroyed bridges, doeks, truek eolumns, vehieles, ships.

By no means the least reason for the sueeess of the 14th's unorthodox eampaign was its nimbleness in shifting objeetives. When the Japs were using rivers in the Tungting Lake area, the 14th went after boats—and sank 1,104 junks, about 500 motor boats, and sundry steamers. So the Japs took to trueks. They lost more than 1,000 along roads watehed by the 14th's planes.

Statisties—suehas the faet that in these months the 14th eliminated the equivalent of three Jap divisions—point up this year of eontradietions. They do not obseure the more bitter faets, the red side of the ledger. Often men of the 14th went hungry, sweated out uneertain supplies, got lost in the hinterland. Being men and not eharaeters in a romanee, they sometimes got impatient with their Chinese Allies, and plain fed up with China and war in general. Many were killed and wounded. All, of eourse, were too busy to eoneern themselves with historie generalities. This gap has been memorably filled by the Chinese who eovered the year's eampaign for the Chungking *Herald*, in whieh he printed his durable eonelusion, "The 14th Ameriean Air Foree has fought its way into history." ☆

Last Days of an Airbase

BY LT. COL. A. T. HOUSE

14th Air Foree

In the spring of 1944, the Japanese broke southward out of the Tungting Lake area and it was impossible to hold them. The Chinese ground forees just didn't have the firepower at that time, and even with the heaviest and elosest air eoordination we had to give ground.

Just before the evaeuation of Kweilin, Brig. Gen. Clinton D. (Casey) Vineent gave me orders to hold the Lingling airdrome, and I took nine fighter planes, thirteen pilots and nine ground personnel down there with the intention of holding the base. Every man eame along of his own volition; no man was ordered to take the job.

On the morning of September 3, 1944, the last eontingent of the Chinese Army between the Japanese and Lingling retreated to the west side of the Siang River, leaving the airdrome, on the east bank, unproteeted. This group of Chinese was the rear guard and had been proteeting Lingling and the surrounding area.

The Japanese already had surrounded Changning on three sides, and although they had by-passed the fourth side, they had eontrol of the road and were moving on Lingling down the Siang Valley eorridor. The last report we had from the Chinese warning net was that the Japanese were 20 miles away, but we didn't know exaetly where.

Our main worry was that the Japanese eavalry might sneak up on us and eateh our planes on the ground without fuel. If they eame in by night we would have to leave our planes and swim the river. We had a eouple of sampans tied up to the bank but we didn't think they eould do us mueh good. The Chinese warning net had pulled out and so we set up our own—six men out in the hills with Very pistols. They were to shoot the pistols at the first sight of approaehing Japanese eavalry and then run to beat hell.

One day our warning net spotted two enemy aireraft and signalled the information to the airdrome. Two of our planes went up and dropped one of the Japs. We had planes in the air every moment of the day, in flights of either four or five planes. We had to have a patrol up at all times and so when one group was on the ground being refueled, the other flight was in the air. No plane stayed on the ground more than 10 minutes, and our planes averaged 15 hours a day, not ineluding night flying. One day we flew nine missions and on the next day there were six. When the planes were on the ground, the pilots had to remain in the eoekpits, and when we were able to get food—we went hungry a lot in those days—the pilots were fed seated in their planes.

We pulled out when the first Jap eolumn was about six miles away from the Lingling airdrome. We blew it up a half an hour later. The Chinese wanted to destroy the field, too, and we had to ehase them off with pistols to keep them from blowing it up while we were still on it. One transport left about half an hour before our fighters and took the ground personnel exeept for the engineer and his assistants who set the eharges whieh destroyed the field. These men then erossed the river, elimbed into a jeep and got away.

General Vineent figured that in 1½ days the squadron flew 144 sorties, not eounting night patrols. He also said that as a result of the sorties flown at Lingling, the Japanese advanee on Kweilin was retarded from four to five days, enabling our forees to evaeuate Kweilin without loss of equipment, personnel or vital supplies. ☆

CROSS COUNTRY

News and Views around the World

30,000 Strong—Page 38

Destination—Tokyo

Four days before Germany signed the Reims surrender, hundreds of freight cars loaded with AAF supplies were rolling eastward to Newark's overseas depot. Then a cable from General Spaatz to General Arnold, and a teletype from Washington to the ATC Supply Division at Wright Field, effectually ended the war in Europe as far as further shipments of air supplies were concerned.

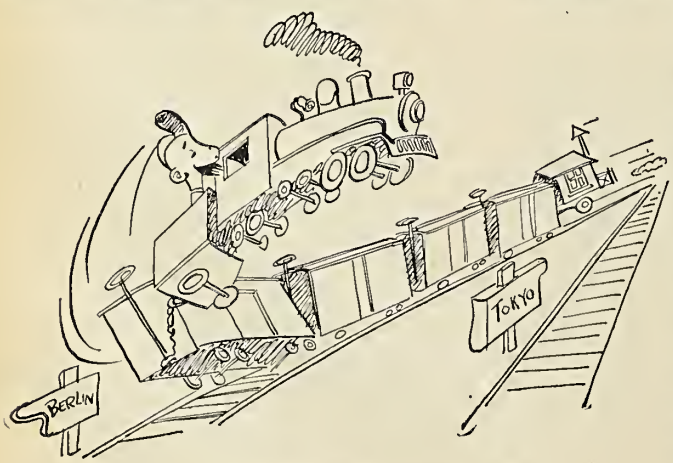
Teletypes and telephones all over the country began ringing with orders to stop all eastbound AAF freight, to cancel all further shipments and to unload cars and ships that had not yet started moving. In the next 72 hours, 369 freight cars were pulled out of trains and headed back to depots where they had been loaded. By Monday, the day before the capitulation of Germany, and the day on which the official Army embargo on all railroad shipments was put into effect, only 21 AAF cars were still moving east.

The titanic flow of war supplies to the ETO, except those needed to sustain units remaining in Europe, had been stopped without a hitch—the tremendous volume of two-way traffic across the United States was virtually ended. From V-E day on, most supplies moved toward but one destination: Tokyo.

Since November, all supplies destined for ETO had carried "Ship" or "Stop" markings. "Ship" meant those supplies that would be needed after the fall of Germany. "Stop" indicated those supplies which would not be needed.

Special markings on ETO requisitions for many months had indicated whether or not the supplies would be needed after V-E day. Goods so marked were promptly reviewed in the States and thousands of tons of supplies were stopped before they got out of warehouses, the pay-off of careful planning on the part of Maj. Gen. L. T. Miller and his associates in the Supply Division.

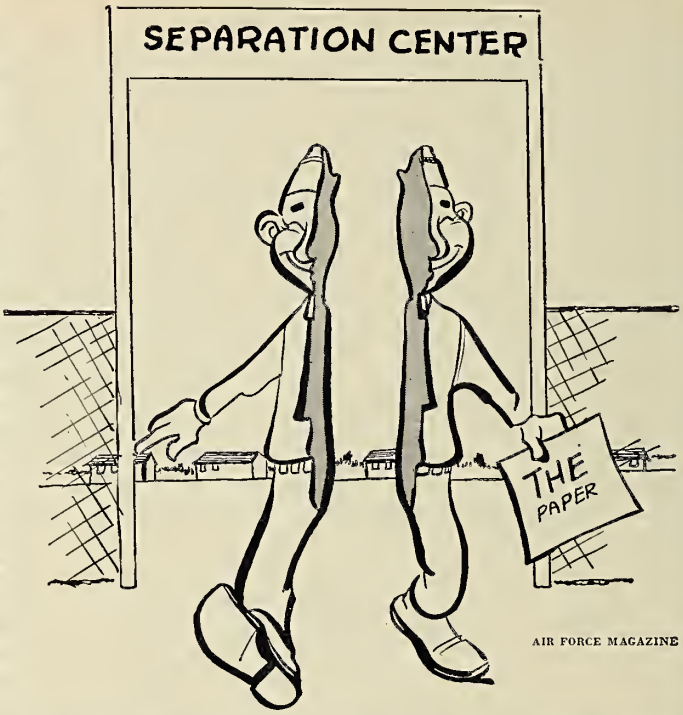
Orders were given, switches were thrown and supply trains were shunted into sidings from which they were returned to warehouses or rerouted without causing any freight jam in railyards or at AAF depots.



". . . *Switches were thrown* . . ."

Less than two weeks after V-E day the first movement of several thousand B-17s and B-24s, each carrying a maximum of 20 men, air and ground crews from Europe, began to arrive at Hunter Field, Savannah, Ga., and Bradley Field, Windsor Locks, Conn. They had hurried essential personnel home from one war to be made ready for another.

Some groups are scheduled to fly or be shipped direct to the Pacific and India-Burma and China theaters. The groups going direct to the Japanese warfront from ETO are carrying 60-day supplies of bolts, nuts, wingtips, instruments and all other essential stocks. This would have been a normal stock level in the ETO, but it is only half enough at the end of our extended supply lines in the Asiatic-Pacific theater. Another 60-day supply therefore is being sent to the Pacific to meet each group at its destination. And, this 120-day stock-level will be maintained as the minimum level for all continuing operations, being replenished periodically through normal supply requisitioning channels.



Some groups moving direct to the Pacific area will not have the required organization equipment to take with them. Two days after V-E Day, the first shortage list was received at ATSC from a ground force unit which carried some AAF equipment. Immediately, the needed supplies were packaged and shipped to the Pacific to be there when the ground unit reached its destination. The same system has been followed on all subsequent shortage lists sent in by ETO outfits.

As much as 70 percent of the equipment in Europe on V-E day may be returned to the States, or shipped to forces fighting Japan. The job of supervising and repackaging this equipment is being handled by the same men who went to England early in 1944 to help move the mountains of supplies across the channel with the invasion forces. Actual crating is done by men of the squadrons and groups who will be using the same equipment against Japan on the other side of the world. Special purpose motor vehicles, such as C-2 wreckers, are shipped to Providence, R. I., where they are overhauled and sent on to the Pacific area. Reconditioning of standard vehicles is taken care of by Ordnance.

In addition to the problems of keeping the AAF's forces supplied as they are redeployed, provisions were made for the aerial movement by ATC of 50,000 men per month from Europe to the States via northern and southern routes. Compak kits (30-day supplies for a group of planes) were dispatched to South America the same week that Germany fell. These keep the C-47s of the Troop Carrier Command stocked with spare parts as they meet the trans-Atlantic C-54s upon their arrival at Natal, Brazil, with veterans from the European war.

At the other end of the line, Troop Carrier C-47s are flying men from Europe to Casablanca where they make connection with the Air Transport Command's trans-Atlantic service—the most tremendous aerial movement of personnel ever planned or accomplished.

". . . Plus Free Medical Care"

The corporal needed a doctor. Fire had swept through the lonely little outpost at Fish Lake in Canada's Yukon country and fumes had struck down Joseph B. Guagnini, one of the AAF Weather Service observers. Unable to revive him through artificial respiration, fellow observers radioed the nearest airbase at Whitehorse for professional assistance.

Capt. Harve W. Jourdan of Newton, Ill., a medical officer assigned to the Air Transport Command's search and rescue squadron, buckled on a parachute, strapped another chute to a portable oxygen and resuscitation set and took off in a C-47 in

the sub-freezing night. When the signal fire was finally sighted, the pilot dropped down to 1,300 feet and slowed the big ship to 87 miles an hour—two miles short of stalling speed—as Captain Jourdan, making his first night jump, slipped through the emergency hatch and landed less than 50 yards from the station.

Quickly diagnosing a case of severe carbon monoxide poisoning, the captain radioed the circling C-47 to drop the resuscitation equipment, forced the unconscious weatherman to take deep, regular gulps of pure oxygen and, in less than an hour, pulled the corporal out of his personal blackout. Evacuated by ski plane the next morning, Guagnini responded rapidly to treatment at the Whitehorse base hospital.

Dutch Treat

Dutch civilians, grateful for the tons of food showered down upon them by heavy bombers of the 8th Air Force shortly before V-E day, showed their appreciation when the Fortresses made their second visit with another 800 tons of 10-in-1 rations for the famished population. When the planes came in for the drop they saw a message spelled out on the ground with rocks and logs.

It said: THANK YOU, BOYS.

More Proof

If any further proof is needed—and we don't think it is—that the B-29 is built to take a lot of punishment, consider the recent case of one Superfortress that lost part of its left wing in a collision.

Two B-29s collided over the bombing range at Halliday Island. One of them, damaged so badly it could not be controlled, went into a deep plunge and crashed. The other, with 14 feet of the left wing missing, spiraled at 20,000 feet. The pilot, 1st Lt. Woodrow B. Palmer, leveled the plane out at 15,000 feet after a fight with the controls. He began a normal descent at 180 mph indicated.

At 12,000, he went through a simulated landing procedure to check stalling speed. Despite the clipped wing, the plane showed no stalling characteristics until the airspeed was down to 135 mph indicated.

Palmer finished his let-down and brought the plane in, using extra power on engines 1 and 2 to keep the short wing high as he broke the glide. To the credit of the pilot as well as his Superfort, the landing was made without further mishap.

Shutter Happy

"Every gunner in our plane was busy pumping 50 caliber shells into Japanese installations and motor transports, which made me feel like excess baggage because all I could shoot was my camera," complained T/Sgt. Ray B. Lee when his B-25 returned to its base in India.

"From our tree-top altitude everything went by us so quickly I hardly had time to point the camera before we were out of range. Then I spotted what looked like oil

QUESTIONS
on Policy and Procedure

Q. When a rated officer holds a commission in the Air Corps Reserve and holds a higher temporary rank in the Army of the United States, should the officer enter the symbol (01) Air Corps Reserve or the symbol (18) for the temporary rank of the AUS in column 1 of AAF Form 1?

A. *When a rated officer is commissioned in the Air Corps Reserve the symbol (01) is used in accomplishing AAF Form 1.*

Q. May an intelligence officer assigned to a bombardment group and participating in frequent combat missions as an aerial photographer be awarded the Air Crew Member Badge?

A. *Yes, providing the aerial photographer is assigned as a* regular member *of an air crew and has demonstrated his proficiency as such, he may be authorized by his CO to wear the aviation badge "Air Crew Member." (AAF Reg 35-30, as amended).*

Q. Does the policy of granting leaves to WAC officers, Cir 462, WD, 1944, concurrently with leaves or furloughs of their husbands who are in the armed forces, when the exigencies of the service permit, apply equally to members of the Army Nurse Corps?

A. *Yes, although this point is not covered specifically in any directive. The Surgeon General's Office advises that when the exigencies of the service permit Army Nurses are granted leave concurrently with leaves or furloughs of husbands who are in the armed forces. Leaves will not be in excess of the amount of accrued leave a nurse has to her credit.*

Q. Should any action be taken in the case of personnel who have been authorized good conduct medals by headquarters to which previously assigned, although such personnel have not qualified for this rating by attaining the minimum standards for character and efficiency ratings?

A. *No. The Adjutant General advises that persons previously authorized the Army Good Conduct Medal in General Orders may continue to wear it unless the order is rescinded by the headquarters making the award.*

Q. In the June issue of AIR FORCE, the question was asked, "Will WD MD Form 81, now in the hands of troops be automatically withdrawn and replaced by the revised form, Immunization Register and Other Medical Data, WD AGO Form 8-117?" The answer was, "No," in accordance with Sec IV, Cir 32, WD, 1945. Is this still true in view of AR 40-215, 25 April 1945, which supersedes Pars 1 and 2, Sec IV, Cir 32, WD, 1945?

A. *Under AR 40-215, issuance of the new form is not automatic. However, it will be issued at convenience of personnel officer.*

Q. Are the provisions of C 1, AR 345-400, applicable to Morning Reports prepared by AAF organizations?

A. *No. Personnel reported as assigned, attached unassigned, or attached will continue to be recorded by grade. (AAF Ltr 35-107, 18 April 1945).*

Q. How is the amount of time to be allowed for detached service for travel computed?

A. *The amount of detached service allowed for travel is determined by the method of travel. If it is performed by rail, the time allowed is that required by the shortest most usually traveled route; if travel is* actually performed *by privately owned automobile, travel is allowed at the rate of 200 miles per day (para 1, AR 605-180, C 3, 31 March 1944). The day of departure from the old station and the day of reporting at the new station are counted as days of detached service. Any delay en route must be provided for in the travel order or granted as leave of absence.*

Q. Par 4a, Sec II, TM 20-221, February 1945, "War Department Accounting Instructions for Unit and Headquarters Funds," states that all "changes and erasures" in the Council Book, WD AGO Form 10-4 (WD QMC Form 15), and papers pertaining thereto will be authenticated by the initials of the proper custodian. Does this mean that erasures are permissible?

A. *No. A line should be drawn through an item in error, and the item initialed. The WD agency responsible for the publication of this Technical Manual advises that the inclusion of the undesirable procedure was inadvertent. At such time as amendments are processed to the Manual an appropriate change will be made.*

PREPARED BY THE OFFICE OF THE AIR INSPECTOR

cans off to our right, and not wanting to return home with a full camera of unexposed film, I kept the shutter going and got quite a few shots of the area."

When these random shots were developed and complete photo interpretation was made, Sergeant Lee was called in by his commanding officer and congratulated on photographing what turned out to be the largest enemy supply dump found in Burma.

The 12th Bombardment Group and Royal Air Force fighter-bombers promptly blasted the entire supply area and effectively reduced Jap opposition to British forces in the Meiktila sector. The sergeant received commendations from both the 10th Air Force and the Royal Air Force for discovering a target of such strategic importance.

Smiles of anticipation

Good form, feet together, piece slung on right side.

Gurkhas

Gurkha paratroopers, to whom Jap-killing is an exhilarating sport, dropped behind enemy lines in the battle for Rangoon and took an important part in driving the Japanese out of Burma. The Gurkhas, seemingly fearless in battle, were flown by American pilots in C-47s and went into combat under direction of British, Australian and Canadian jumpmasters. Along with the paratroopers went their supplies carried in parapacks, dropped by the Combat Cargo Task Force of the Eastern Air Command.

The Pay Off

Construction of a 285-mile stretch of road between India and Burma, complete with all its winding, snake-like convolutions through the towering Himalayas, was a lonely and heartbreaking task for engineers. Cpl. Jesse J. Crews, a combat returnee, spent most of his 33 months overseas helping to build that road which has been named in honor of General Joseph Stillwell. As a member of the 823rd Aviation Engineer Battalion, he operated a bulldozer, air compressor, drove a truck and served as a mechanic. It was strictly unglamorous work and not until the entire job was completed did he feel that his work had been worthwhile, the corporal says.

"Just before I left I saw the first convoy go through. The trucks were decorated with American and Chinese flags. Truck after truck, sometimes they passed for 30 minutes without a break—it was really exciting to watch. Those of us who had sweated in the jungles and shivered with malaria felt that day that we had accomplished something very important—that our work would not be forgotten."

Reception

Since the comparatively recent arrival of the 2nd Air Commando Group in the India-Burma theater, a spirit of amiable competition has developed between the new organization and the 1st Air Commando Group, which participated in the Wingate-Cochran glider invasion of Burma in 1944.

Recently the 2nd Air Commandos—considered by the 1st to be their junior namesakes—made a glider landing on a newly captured Jap airstrip near Lewe, on the road to Rangoon. When the glider doors swung open and the 2nd Air Commandos poured out, well armed with tommy guns and hand grenades, the first thing they saw was four 1st Air Commando L-5 pilots, sitting on a rice paddy ridge, quietly puffing cigars.

"What's the big idea?" muttered one of the newly arrived warriors, glancing beyond the pilots to their L-5s parked nearby.

"Well, sonny," replied T/Sgt. "Pappy" Myers, grizzled veteran of the 1st Air Commandos, "we heard you fellows were coming to Lewe, so we thought we'd better hurry down to haul out your casualties."

30,000 Strong

More than 30,000 members of the Women's Army Corps, on duty with the Army Air Forces, are assigned to 226 different types of jobs at some 200 airbases at home and abroad. They are on duty in all the active overseas theaters and at isolated bases of the Air Transport Command.

Individual Wacs have been awarded the Bronze Star, Legion of Merit and the Air Medal. As units, they have been praised highly by their commanding generals. Several Wacs, serving in England, were awarded the Purple Heart because of wounds suffered as a result of German robot bombs.

In recent months it has become a familiar sight to see Wacs wearing the wings of an aircrew member. These are women who serve as crew chiefs and radio operators on transport planes. According to recent WD figures there are 15,546 members of WAC overseas, including 7,000 AAF Wacs.

The five Wacs pictured on the Cross Country cover are assigned to the 3rd Air Force, and we add this pertinent data: lower left, Cpl. Dorothy Wright, 25, of Brockton, Mass.; center, Sgt. Dorothee A. Buckley, 23, of Cleveland, Ohio; lower right, Pfc. Karen Smuland, 26, of Duluth,

Minn.; upper left, Pvt. Jeanne E. Broecker, 21, of Oak Park, Ill.; upper right, Cpl. Mary N. Poese, 23, of St. Louis, Mo. The picture was made by Lt. Oscar C. Sweet, 3rd Air Force photo officer.

Surprise

Maj. Robert D. Payne, Jr., B-25 pilot from Greenfield, Mo., flew 45 missions out of New Guinea with a broken back.

The major had to ditch his plane in the sea after his seventh raid, and later a physical examination and X-rays failed to disclose his injury. So, after a short leave, he began flying again and became an operations officer, and later a squadron commander. Forty-five missions followed, and then a second checkup revealed the fractured vertebra. "I was surprised when I heard the news," he said. The major is now at an AAF Convalescent Hospital in Miami Beach, Fla.

NAAFW Educational Funds

Educational assistance is now available to certain dependents of AAF personnel through the Scholarship Fund of the National Association of Air Forces Women. This association has established a student lending fund which advances money without interest or collateral to deserving students in order that they may attain their educational goal. These students must be the children of Army Air Forces military personnel.

The awarding of these scholarships will be on a non-competitive basis; however, first consideration will be given to the children of deceased prisoners of war. Applications for assistance should be made at least six weeks before the beginning of the semester for which funds are needed.

Article V in the constitution of the association defines the purpose and benefactors of this fund. "The association will establish, foster and develop a fund to assist in furthering the education of deserving children of Army Air Forces military personnel who have died while prisoners of war by making gifts or loans to such children to enable them to meet the necessary expenses of their education and by establishing scholarships for such children and for other deserving children of AAF personnel."

A Scholarship Fund Committee has been appointed which includes: Mrs. Howard C. Davidson, chairman, wife of Major General Davidson; Mrs. Oliver P. Echols, wife of Major General Echols; Mrs. Laurence S. Kuter, wife of Major General Kuter; Mrs. Arthur Vanaman, wife of Brigadier General Vanaman, and Mrs. William Crom, wife of Colonel Crom.

The members of this committee have made a study of the questionnaires and methods of several scholarship funds or foundations, and forms stating regulations and restrictions which will govern this fund have been drawn up.

Inasmuch as the announced policy of the association is to give first consideration to the children of deceased prisoners of war, interest in the fund has been accentuated by recent disclosures of conditions in Ger-

PLANE BONERS

Analyzed by Veteran Pilots

APO 493—Two hours from target on a tactical bombing mission in a B-29 the No. 3 engine began acting up and lost power. Remaining three good engines were operated at high power ratings, resulting in excessive fuel consumption. Lack of fuel forced crew to abandon.

Comment: If a shot of conscience could be injected in all crew members so they would abide by the limitations of their plane, accidents such as this wouldn't happen. B-29s, more than any other bomber, are team play planes. In this accident fuel consumption was judged by gages, neither the pilot nor engineer utilizing the cruise control data in computing gasoline used at the higher power rating. As a result the Superfort was flown beyond the point-of-no-return.

VENICE, FLA.—Pilot in P-51C came in for a night landing and the plane held a steady diving turn of about 90° to the left and crashed into the runway. Investigation disclosed that this pilot had removed the masking tape used to dim lights for night flying. On lowering his head to check instrumennts he probably was momentarily blinded by the glare from the unshaded light, losing his horizon as a result and crashing to his death.

Comment: Watch out for glare from unshaded lights during night flying—it only takes an instant to lose your dark adaptation. Read your Pilots' Information File for full information on aids to night vision.

DELAVAN, KAN.—At 20,000 feet in a B-29 the tail gunner lit a cigarette before he had completed checking his oxygen regulator and turned it off. A small fire resulted and when he reached down to turn the oxygen off he inadvertently turned it on, enveloping the whole tail turret in flames. He later died from the burns.

Comment: Don't smoke until you are certain the oxygen regulator is off.

COLUMBIA, S. C.—A normal landing approach was made in an A-26, but it hit the runway excessively hard. Nosewheel collapsed and props hit runway.

Comment: Landing the A-26 successfully requires power on throughout the approach and flare out. As plainly stated in the A-26 Pilot Training Manual and pictured in OFS's film, "A-26 Flying Tips," keep the nosewheel up, landing in an almost level attitude, nosewheel touching last.

AUSTIN, TEXAS—Flying speed was reached in a C-46D but it would not pull off the ground. Pilot chopped power and applied brakes but speed was too great to stop on the slick runway and the plane crashed into a drainage ditch.

Comment: Crew chief had failed to remove right elevator lock. No external or cockpit check was made by the pilot. Crew chiefs should give pilots an even break by getting planes in proper flying condition. Pilots who don't check their planes or test controls for freedom of movement don't add any dignity (or numbers) to their profession.

MERIDIAN, MISS.—P-51 pilot taxied to line and brought airplane to a stop. After checking cockpit he looked away and in attempting to cut engine he reached for mixture control. Mistakenly, he pulled prop governor control to full back position and as rpm dropped opened the throttle fast. The P-51 nosed up.

Comment: Look before you pull.

WILMINGTON, N. C.—Tow target was shot off by a pilot in a P-47N while making a firing pass from 3 o'clock position. Attempting to avoid the free falling target by shoving the stick forward, the P-47 tangled its left wing with the target. Damage exceeding $6,000 resulted, even though the plane landed safely.

Comment: A shot off target goes down. Best way of keeping clear if you are above it: go up.

BROWNSVILLE, TEXAS—With a gusty, 23 mph wind blowing, a P-47 started stalling in on its left wing during landing. The pilot gave it throttle with the left wing a foot off the runway. The wing struck the runway, pivoting the plane around into a groundloop.

Comment: Coordinate controls or torque will get you. A sudden surge of power will cause your left wing to drop. Be ever ready to correct with right rudder.

LONG BEACH, CALIF.—A B-17 combat returnee with eight hours in B-25s as his total 2-engine time took a P-38 up to 1,000 feet. The P-38 fell off on one side and spun in, killing the pilot.

Comment: Witnesses to the accident stated that one prop ran away. Examination of prop units disclosed that the left prop was in full low pitch. This pilot had no previous P-38 time and no experience with electric propellers. How he was cleared to fly, if he was, remains a mystery. Don't fly any airplane you don't understand.

PREPARED BY THE OFFICE OF FLYING SAFETY

NEW BOOKS

WAR

TANKS AND ARMORED VEHICLES. *Robert J. Icks.* Pictorial account of the development of armored military vehicles. DUELL, SLOAN & PEARCE, N. Y., 1945.

HISTORICAL

HIGH JOURNEY: A DECADE IN THE PILGRIMAGE OF AN AIR LINE PIONEER. *Carleton Putnam.* Adventures in the development of air transportation. SCRIBNER'S, N. Y., 1945.

POSTWAR

AIR POWER FOR PEACE. *Eugene E. Wilson.* An appraisal of the value of air power and its impact upon military and economic security. MC GRAW-HILL, N. Y., 1945.

CAREERS IN SAFETY; CHOOSING A VOCATION IN THE FIELD OF ACCIDENT PREVENTION. *Herbert J. Stack.* Opportunities for a career in the field of safety work. FUNK & WAGNALLS, N. Y., 1945.

TECHNICAL

INTRODUCTION TO PRACTICAL RADIO. *Durward J. Tucker.* A reference book for practicing radio engineers and technicians, as well as a manual for beginners. MACMILLAN, N. Y., 1945.

THE MATERIALS OF AIRCRAFT CONSTRUCTION. *F. T. Hill.* The materials used in aircraft construction and problems in the design of aircraft. PITMAN, N. Y., 1944. 6th ed.

PRODUCTION ENGINEERING IN THE AIRCRAFT INDUSTRY. *A. B. Berghell.* A text embodying principles for the solutions of problems encountered in the aircraft industry. MC GRAW-HILL, N. Y., 1944.

THE RADIO AMATEUR'S HANDBOOK. *American Radio Relay League.* A new edition of this manual of amateur radio communication, revised for wartime and post-war needs. AMERICAN RADIO RELAY LEAGUE, WEST HARTFORD, CONN., 1945.

SCIENCE IN PROGRESS. *George A. Baitsell, ed.* Reports of the latest developments in the nation's laboratories. YALE UNIVERSITY PRESS, NEW HAVEN, 1945. 4th series.

YEARBOOKS AND HANDBOOKS

THE AIRCRAFT YEARBOOK FOR 1945. *Howard Mings, ed.* The most recent issue of a standard aeronautical annual. LANCIAR PUBLISHERS, INC., N. Y., 1945.

DICTIONARY OF TECHNICAL TERMS. *F. S. Crispin.* A new edition, revised and enlarged, of this reference book. BRUCE, MILWAUKEE, 1945. 6th ed.

These books are available to AAF personnel through the AAF Field Technical Library Service, which provides for technical libraries at all major installations. For a complete list of books so available, see TECHNICAL PUBLICATIONS FOR ARMY AIR FORCES FIELD TECHNICAL LIBRARIES, Book List No. 2, March 1945 and supplements thereto. These lists are compiled by AAF Headquarters Library.

Personal copies of these books may be obtained from the publishers or retail book stores.

man prisoner of war camps. Within the first two weeks after V-E Day, the association received gifts totaling $3,500 from servicemen and servicemen's clubs alone. Largest of these contributions was the one of $1,500 from the Non-Commissioned Officers Club at the Tonopah, Nev., Army Air Field.

Battle Honors

The latest list of AAF units authorized by Headquarters to wear the Distinguished Unit Citation badge shows an even dozen additional to those originally published in the March issue of AIR FORCE and in the supplementary lists to be found in each succeeding issue. The following condensed versions of the citations include the number of the unit, the date and a brief description of the action, and the number of the War Department General Order in which the authorization was published.

392nd Bombardment Group (H) Feb. 24, '44

Survived a running attack by nearly 150 enemy fighters lasting two and a half hours to attack the aircraft and components factory at Gotha, Germany. When the Initial Point was approached, the units of the lead combat wing were seen to be proceeding on divergent courses. Faced with the alternative of following the lead units of the air division or pursuing a separate course that might be erroneous, the group made the latter choice, fighting its way through intense flak to pinpoint the target and virtually destroy it. Seven of its bombers were lost and 13 more damaged, with a confirmed toll of 16 enemy aircraft destroyed. (GO 37, '45)

20th Fighter Group Apr. 8, '44

Executed a four-hour fighter sweep over Germany from bases in England, during which time its P-38s destroyed 5 enemy aircraft in the air and 20 on the ground, and destroyed or damaged 18 locomotives, 50 freight and oil cars, 16 flak towers, and various factory buildings, hangars, oil storage dumps, etc. (GO 34, '45)

416th Night Fighter Squadron Apr. 10-11, '44

Maintained continuous night patrols over enemy territory after the establishment of the Anzio beachhead to carry out its assigned mission of protecting shipping, personnel and materiel from enemy night bombers. During one patrol, two Beaufighter crews, ignoring their numerical disadvantage, turned into a formation of 30 to 40 enemy bombers approaching the beachhead area, destroying one, damaging another and causing the remainder to disperse. (GO 35, '45)

484th Bombardment Group (H) June 13, '44

Successfully bombed the marshalling yards at Innsbruck, Austria, after finding its initial target at the Munich marshalling yards so heavily blanketed by smokescreens that visual bombing was impossible. The small formation of 37 B-24s set out on its mission though weather conditions forbade a rendezvous of the planned large assault force, survived attack at Munich by 50 enemy fighters (in which they lost 5 bombers while destroying 18 enemy aircraft) and persisted in its attack on the heavily-defended alternative target 60 miles away, though the formation had already been severely mauled. (GO 35, '45)

362nd Fighter Group Aug. 25, '44

Struck a telling blow against the enemy at a critical point in the campaign in Northern France by attacking naval and merchant vessels in the harbor of Brest. In 4 successful missions, planes of this group scored direct hits on 2 cruisers and 12 additional craft including heavily-laden transports evacuating enemy personnel. (GO 32, '34)

55th Fighter Group Sept. 3-13, '44

Compiled one of the outstanding records of enemy aircraft destroyed or damaged by one group in any similar period of air combat over Europe during 8 heavy bomber escort missions flown in 11 days. In the tremendous task of wresting superiority from the GAF, the group made a material and noteworthy contribution by destroying 106 planes and damaging 51 in the air and on the ground, while losing but 9 aircraft. This ratio of nearly 12 to 1 was achieved both at high altitude during the escort phase and in medium and low level combat after the bombers had been brought safely through the target area. (GO 35, '45

27th Fighter Group Sept. 4, '44

Seriously hindered the enemy's efforts to withdraw from the Dijon area of France by flying 13 missions on this date against motor transport, trains, railway guns and horsedrawn artillery units despite the handicap of operating from bases 200 miles from target area. Personnel showed tireless devotion and exceptional skill in servicing the P-47s of the group through a week of attacks in which the pilots destroyed 57 enemy locomotives, 126 loaded railway cars, and approximately 300 vehicles together with a thousand or more of the personnel manning them. (GO 32, '45)

339th Fighter Group Sept. 10-11, '44

Destroyed 58 enemy aircraft on these 2 days while engaged in escorting heavy bombers and in low level attacks against enemy airdromes. The actions took place at an airdrome near Erding, Germany, on the 10th; and during an escort mission at Munich and a strafing attack on an airdrome at Karlsruhe on the 11th. In addition, 66 enemy aircraft were damaged during these operations. (GO 34, '45)

356th Fighter Group Sept. 17, 18, 23, '44

Comported itself with such distinction in preparatory attacks on ground defenses around Nijmegen, Holland, that the lives of many airborne troops were saved and the success of the subsequent landing operations was assured. In these attacks the pilots attacked pill boxes, machine gun posts, flak emplacements and other small, concealed targets which placed the planes at a severe disadvantage. (GO 35, '45)

78th Fighter Group
353rd Fighter Group Sept. 17-23, '44

Gave invaluable aid and relief to our forces on the ground during the airborne assault in the Arnhem-Nijmegen area. During this period, pilots of the 78th Group destroyed 16 flak installations, numerous enemy vehicles, locomotives, trains, etc. In the same week, pilots of the 353rd Group accounted for 25 enemy aircraft, shot up 66 flak installations as well as numerous bridges, radar stations, etc. The 78th Group lost but 5 planes in the week's action, the 353rd Group, 6. Save for details of destruction, the citations are virtually identical. (GO 34, '45 for the 78th Group, GO 35, '45 for the 353rd Group)

56th Fighter Group Sept. 18, '44

Carried out the extremely difficult and dangerous mission of direct cooperation with the airborne landings in Holland so successfully that the effectiveness of enemy flak against our troops was greatly reduced. In spite of weather that compelled the planes to come in on the deck so they were silhouetted targets for enemy fire, the pilots of the 56th Group, Lt. Col. David C. Schilling commanding, swept in ahead of the airborne armada, sought out and attacked enemy flak positions in the face of superior and concentrated fire. The attack cost 16 of the 39 planes dispatched, but, because of it, the landings were a complete success. (GO 34, '45)

Banzai!

A mechanic's eye-view of what happened when 400 Japs made a banzai attack on Iwo Jima has been told by Sgt. Harry Hamilton, one of ten men involved in a single phase of the night battle on March 26. Hamilton and nine other P-61 mechanics were asleep in their tent when the infiltrating Japs came upon them.

A blade ripped the canvas and a grenade hissed in through the opening. It rolled across the tent and stopped under a packing case. Hamilton was blown out of bed and awakened on the dirt floor with his shoulder nicked, says S/Sgt. Robert O. Frederick, an AAF combat correspondent. Bullets sprayed the tent at waist level. Rifle barrels poked through holes in the north and south ends of the tent and bullets peppered the double rows of cots.

"It was cockeyed. The whole affair," Hamilton said afterward.

The first thing he did, after finding himself on the floor, was to wrap a tourniquet about the leg of a badly wounded companion, a rather confused, automatic reaction which saved the man's life.

Cpl. Bernard J. Overesch, hearing the Jap at the south end of the tent, put a carbine to his shoulder and waited. A form then appeared and more bullets sprayed the tent. Overesch pulled the trigger and nothing happened. A shot from somewhere else felled the Jap, but not before one of the mechanics lay mortally wounded and another seriously wounded.

Cpl. Hiram R. Savidge, aroused by the commotion, got up and modestly wrapped himself in a blanket. Later he found that a bullet had cut the blanket.

By that time the groans of one of the wounded mechanics was drawing fire.

"There wasn't time to be gentle," Sergeant Hamilton reported after it was all over. "I gagged him to keep him quiet, then crawled to the south end of the tent."

Two Japs were standing just outside the door talking to a fatally wounded comrade. Hamilton drew a bead and pulled the trigger. This carbine also jammed. He grabbed another one. It jammed. That was too much. Hamilton began to swear, angry fourth echelon stuff.

Outside, the dying Jap stirred in protest: "Don't talk like that," he jeered. "It isn't nice."

The two other Japs were under cover by then and Hamilton moved back to the center of the tent and cut a small slit near the ground. Through this he could see a foxhole between his tent and the one adjacent. It was occupied by seven Japs.

On the other side three Japs were crawling closer to the tent. Hamilton fixed his sights on one of them. Suddenly a Jap officer dropped to his knees. In his upraised hand was a potato masher grenade. Hamilton shifted sights to the officer and fired. The officer doubled up, still clutching the grenade. It exploded, and the other Japs laughed, as if it had been a boisterous joke.

Action then turned to a Jap who was reluctant to die. S/Sgt. Milwood Hlebof hit him first. The Jap gibbered. Cpl. Frank B. McCollum opened up with his carbine. He fired fifteen shots and saw the Jap flinch with the impact of each one. When the clip was empty, the Jap still stared forward, babbling.

McCollum gave up on this particular Jap and Hamilton took over. "I fired two more shots into him and the guy still kept up his talking and hysterical laughter. I figured my carbine was shooting high so I aimed at the bridge of his nose. The bullet drilled him right between the eyes, and he folded up like a rag."

When dawn sunlight broke over the area, the battle was over and Hamilton suddenly remembered that the Jap officer he had shot had been wearing a saber.

"I ran out to get it," he told the correspondent. "But too late. Some souvenir hunter got there ahead of me."

Release to Airlines

A limited number of officers and flight officer pilots, selected to fill essential posts as civil airline pilots, may now be recommended for release from active duty with the AAF.

They will be assigned either to current airline schedules or to new divisions furthering the prosecution of the war. Eligibility is limited by these three preliminary requirements:

Pilots must have (1) completed a tour of duty in an overseas combat theater or participated in overseas operations of the ATC, (2) have been on duty in the United States for at least six months since their return from overseas, (3) been declared available on the ground that they can be spared or replaced by the AAF.

Letters requesting consideration for this employment should be addressed, through channels, to Commanding General, Army Air Forces, Washington 25, D. C., attention

Dawn revealed riddled American tents and dead Japs.

TRAINING AIDS

Newly Standardized for Field Use

FILMS

TF 8-2096, Dental Health—Designed to teach all men in the army the importance of dental health, including early and regular dental care. Running time: 24 minutes.

TF 8-2093, Strictly Personal—For limited showing to concerned WAC personnel only. No running time listed.

TF 1-3461, A-26 Flying Tips—Takes up most phases of correct takeoff and landing with the A-26 and single engine flight with the same aircraft. Running time: 16 minutes.

TF 1-3460, Aerial Navigations Map-Reading—Demonstrates, by realistic action, the procedure to be followed by the navigator in charting the course of his aircraft. Running time: 21 minutes.

TF 1-3437, 50-Hour Inspection of the B-29: Part IV, Airplane Check-Out—Illustrates the work of airplane mechanics functioning as a team in putting the B-29 through the final phase of the 50-hour inspection. Running time: 35 minutes.

FS 1-2232 Through 1-2234, FS 1-2236, and FS 1-2250 Through FS 1-2260, Pilot's Introduction to C-54A Airplane—Film strip series giving general description and operation of various parts of the C-54A aircraft.

PUBLICATIONS

New Publications Catalog—Contains almost 300 titles of miscellaneous training literature produced by Hdqrs AAF, AC/AS, Training and other agencies. No War Department Field and Technical manuals or AAF Tech Orders included, however.

Two Adt Booklets—"Handbook of Alaska," Informational Bulletin No. 18, and "Handbook of Coastal China, Including Hainan and Formosa," Informational Bulletin No. 19. Request copies from Aretic, Desert and Tropic Branch, AAF Tactical Center, Orlando, Fla.

List and Index of War Department Publications (FM 21-6)—New FM 21-6 which is a consolidation of the present FM 21-6, "List of Publications for Training," and WD Pamphlet 12-6, "List and Index of Administrative and Supply Publications."

Objective Briefing Folder Delayed—Otherwise known as AF Manual No. 61, this folder has been delayed in publication by technical difficulties. Announcement of issuance will be made at later date.

New Bombing Manuals—Three have recently been issued: "Precision Bombing Practice" (AF Manual No. 62); "How to Improve Formation Bombing" (AF Manual No. 67); and "Bombing Charts" (AF Manual No. 79).

GRAPHICS

VHF Posters—Four posters, in full color. Concern knowledge and use of VHF panel switches and lights, practice in homing by use of VHF, respecting radio silence, and D/F (Direction Finding), or position fixing use of VHF.

Chemical Warfare Posters Discontinued—Further publication of both "Standard Series" and pin-up "Calendar Series," AP 1-5011 designation, will not be made.

A-26 Position Firing Poster Series—Binder of 30 poster sheets illustrating position firing rules particularly applying to the A-26 airplane and its varied uses in combat. Developed and produced by Publications Unit of Central School of Flexible Gunnery, Laredo, AAF, Tex.

DEVICES

Bombing Trainer, Type A-8A (Bomb Rack)—This device supersedes the Type A-8 trainer, and is designed to aid in instruction in the operation and functioning of the standard all-electric bomb rack release (Type A-4), and the bomb hoisting brake mechanism (Type C-6).

Trainer Mockup, Type O-56 (C-6 Bomb Hoist Brake)—Device to aid in teaching in a simple visual manner the operation and functioning of the automatic braking assembly of the standard type C-6 bomb hoist. Used in conjunction with Bombing Trainer, Type A-8A (above).

Information on the availability of training aids listed in this column, unless otherwise indicated, may be obtained from the chief, Training Aids Division, Army Air Forces, One Park Avenue, New York 16, N. Y., upon request through channels.

of AC/AS, Personnel, Military Personnel Division, Demobilization and Personnel Readjustment Branch, AFPMP-13.

Such letters should (1) request consideration for employment with a civil airline under the provisions of AAF Letter 35-206, and (2) give the pilot's qualifications, as follows: (a) statement of overseas service, (b) length of service in the U. S. since return from overseas, (c) current flying status, (d) current physical qualifications for flying duty, (e) average manner of performance rating as indicated on AGO Form 66-2, (f) age, height, weight, (g) race, (h) education, as indicated on AGO Form 66-2, (i) flying experience as a pilot, including total hours of single-engine, multi-engine, or co-pilot multi-engine time, and type of instrument rating held, (j) a statement as to willingness to accept or unwillingness to accept employment requiring domicile outside the continental United States.

Unit commanders must authenticate the application as to correctness of information. Subsequent commanders will indorse the application and forward the statement of approval or disapproval together with a statement as to necessity for replacement or the availability of a replacement within the command. Available applicants will then be interviewed by airline representatives. Those selected will initiate a request for relief from active duty, supported by a letter from the airline. Applications for relief from active duty are discussed in War Department Circular 485, 1944. These applications should be distinguished from resignations, which will not be accepted by the War Department for the duration of the war and six months thereafter.

Those pilots who are later found unsatisfactory for airline operation or who voluntarily leave the employ of the airlines to which they have been released will be referred to the AAF for recall to active duty. Likewise, officers on inactive status are subject to recall to active duty, if required by the AAF.

Now He Knows

Pvt. Edwin Robinson, Jr., stationed at Sioux Falls Army Air Field, S. D., should have a fair picture of military service in wartime. Robinson was a Marine corporal at Pearl Harbor when the Japs struck there. Two years ago he volunteered in the Navy and spent a year in that service before he was eliminated from aviation training. After four months as a civilian he was called up for induction and this time he chose the Army. "I was curious to see what it is like," he later explained.

Now for Japan

With victory in Europe, the AAF's huge training program has been reshaped to strike even heavier blows against the Japanese. And while some phases of the training is being curtailed, others are rapidly expanding.

As an example, B-29 training will be more than doubled by Jan. 1, 1946, while

the B-17 training program will be cut in half by that date. The training for one of the AAF's present standard fighters will be cut 75 percent, and training for one of the newer planes will be intensified several hundred percent. Troop carrier and liaison training will be continued in force.

Many redeployed men will be taught new skills, and specialists in groups being converted to use of a new type of plane must first undergo factory or technical school training. A B-17 airplane mechanic, MOS 747, may be a very efficient Fortress crew chief, but if his outfit is going to use B-29s, he will need several months of additional training. This instance applies to many specialists. Men must be trained in the immediate future in central fire control, use of several kinds of electrical apparatus.

"He just checked out in our link trainer."

Re-training will be needed for groups converting from B-25s and B-26s to A-26s.

Many AAF personnel in the Zone of the Interior who have not seen combat must be fitted to replace overseas veterans. It is AAF policy that such personnel shall have the "opportunity" of serving overseas.

Several training command installations will be totally reorganized for new tasks, and plans for this reorganization are subject to quick change as necessity requires. Meanwhile, OCS schools will continue to operate on their present basis, administration and other officers being needed to replace veterans with long service. Combat returnees will continue to hold a priority among applicants.

Here, in brief, is how the end of the war in Europe has otherwise affected the training program:

Glider pilot training is closed to all but rated power pilots.

The only pilot training now available is that open to navigators, bombardiers and glider pilots who are combat returnees and who have not previously been eliminated from pilot training. And it is estimated that only a small proportion of these applicants will get pilot training.

The only aircrew training open to other returnee combat crew members is navigator and bombardier and B-29 flight engineer training.

Procurement of aviation cadets has been stopped. Aviation cadets and aviation students now in preflight school will not be qualified for pilot training. Some of them may go to navigator, bombardier or B-29 flight engineer schools. The remainder will be assigned to technical or other AAF ground training.

Pre-aircrew trainees who have been waiting for flying training will receive ground duty assignments. They will be assigned, without loss of grade, to the continental air forces, to station complements or to technical training.

Air Corps Enlisted Reservists—those who before their 18th birthdays signed up to await aircrew training—have three choices:

1. They may remain in the ACER knowing that when they are called to active duty they will be in the AAF, but not in aircrew training.

2. They may request transfer to the Army Enlisted Reserve Corps, knowing that when they are called they will be in the Army, the branch depending on current needs of Selective Service.

3. They may request discharge from the ACER and become subject to current needs of Selective Service and no longer open to deferment as reservists.

The reduced training schedule is likely to remain in effect since it is believed that aviation cadets and students already in flying training and combat returnees will be sufficient to meet all future replacement needs.

An official War Department announcement states: "The AAF Training Command has concluded its mission of training, as individuals, virtually all the personnel of the world's largest air force. . . . Now the command's mission is to provide a flow of replacements, teach new skills required by special developments in warfare."

From Jan. 1, 1939 through March, 1945, the training command graduated 224,331 pilots, 46,121 navigators, 42,098 bombardiers and 282,836 gunners, a total of 595,381 individuals. The peak of the program was reached in early 1944.

At one time, 60 civilian flying schools were under contract to the AAF to provide instruction in the primary flying phase. Only nine such schools are now under contract, and these contracts will be terminated shortly. ☆

PARACHUTES LOST

42- 1082K	42-542378E	42-684089E
42-100634G	42-546279E	42-738982J
42-195934G	42-546424E	42-762511B
42-383903F	42-552345E	42-796096E
42-405986D	42-639577E	42-805450E
42-436792I	42-676757E	43- 57212E
42-445866A	42-680491E	43- 57572E
42-460986G	42-680989E	43- 57576E
42- 47093H	42-681185E	43- 58284E
42- 47098H	42-682496E	43- 58329E
42-488893A	42-682736E	43- 58756G
42-524985E	42-682783E	43- 67581E
42-541233E	42-682916E	

Return to field indicated by letter after number as keyed below

A—Post Field, Fort Sill, Okla.
B—Atlantic Overseas ATSC, Newark 5, N. J.
C—Army Air Field, Big Spring, Texas
D—Orange County AAF, Santa Ana, Calif.
E—Army Air Field, Harlingen, Texas
F—Eglin Field, Fla.
G—Army Air Field, Yuma, Ariz.
H—Lockbourne AAB, Columbus, Ohio
I—AAF, 515 Pickwick Bldg., K.C. 6, Mo.
J—AAF, Victorville, Calif.
K—AAFPDC, Fort McPherson, Ga.

HOW SHARP ARE YOU?

QUESTIONS

1. What planes are shown?
2. How many truck cranes are attached to the plane at left?
3. What numbers appear on the tail of the plane at right?
4. How many jeeps are in the photo?
5. The top hatch is open on both planes. True or false?
6. How many truck doors can you see open?
7. There is a man standing under the nose of the plane at left. True or false?
8. Is the plane at left off the ground?
9. How many ladders do you see on the ground?
10. Does either plane have a revolving top turret?

ANSWERS ON PAGE 57.

P.O.W.

They called themselves "kriegies"

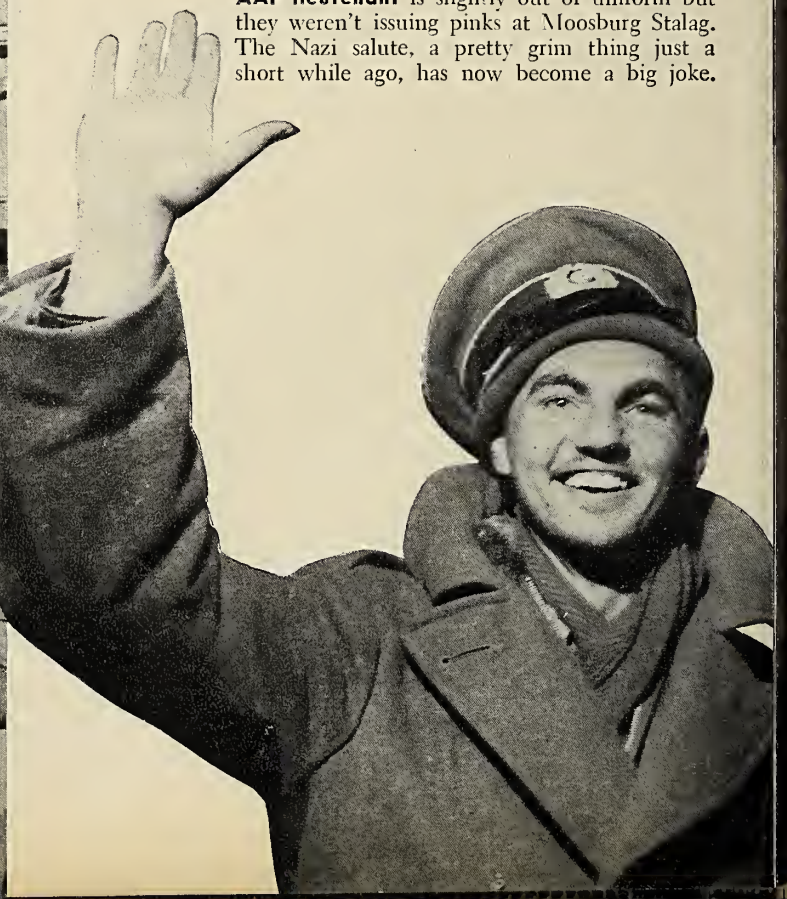
. . . the nazis were "goons" . . .

liberation was wonderful

Do you want to know how an AAF guy feels after spending a couple of months in a Nazi prison camp, do you want to know what it does to him? Then look at this man's face. Look close.

Lt. Harmon Smith, navigator shot down on bombing mission over Germany on Jan. 7, 1944, reads an article in the Stars and Stripes while evac plane takes him home.

AAF lieutenant is slightly out of uniform but they weren't issuing pinks at Moosburg Stalag. The Nazi salute, a pretty grim thing just a short while ago, has now become a big joke.



BY S/Sgt. JIM CHANEY

9th Troop Carrier Command

PHOTOGRAPHS BY T/SGT. ROGER COSTER

Some 30,000 Allied airmen after months of being underfed and living in squalor at Germany's Stalag Luft 3 at Sagan were forced to march 100 miles in sub-zero weather—70 miles without rest or shelter—to a camp at Moosburg that made Sagan seem palatial.

These men, most of them Americans, the others RAF, Polish and Norwegian flyers, were rescued when American armies drove east from the Rhine. The Germans had moved the prisoners west when the Russians came on from the east. Then when the Americans started coming towards them from the west, the Germans didn't know what to do. Their vaunted organization broke down completely, and any faint traces of decency and self-respect left in the Germans after years of their Nazi philosophy disappeared.

The Americans held their discipline, though, while living in evil-smelling huts and leaky tents and eating starvation rations. Things at Sagan, before German transportation and communications broke down, hadn't been too bad. Red Cross parcels came in regularly, and the men, in attempts to relieve boredom, had organized amateur theatricals, baseball and basketball leagues, classes in languages and other subjects.

Discipline was good, the only concession being that saluting among ranks was not required. State clubs were organized where men exchanged what little news they got from home. The Germans put out a paper, which they tried to give the American touch by calling "O. K. Kid." Its "impartial" reports of the news were carefully loaded with heavy German propaganda which fooled no one.

POW millinery modes are fashioned by liberated airmen. Man at left wears GI wool cap, considered quite chic. Black fur job was bartered from Russian slave laborer. Fancy wool chapeau at right was bought from a German guard for two cigarettes.

Lt. Lawrence Townsend, B-17 pilot, brought back his wings, lieutenant bar, and an assortment of Nazi souvenirs pinned to his wool knit headgear. Townsend was captured after being shot down by flak during bombing run over St. Lo, on July 25, 1944.

The forced march from Stalag Luft 3 at Sagan in Silesia, to Stalag 7-A at Moosburg near Munich, occurred in bitter January weather. At Moosburg the Germans had hardly enough transportation or supplies to feed and clothe their own troops, so they let the Allied prisoners starve and freeze. Red Cross parcels were appropriated by the Germans.

In the months at Stalag 7-A the prisoners developed their own slang. They called each other "kriegies," a corruption of the German word *krieg*, meaning war. They improvised things they called "kriegie stoves," "kriegie chairs," and "kriegie pots." Germans were called "goons." For a long time, the Nazi guards and civilians refused to believe the unmistakable news that Germany was collapsing. Finally they could see it, but when they received any particularly bad tidings, they would merely shrug in bewilderment.

For the men imprisoned at Moosburg, these last few months were spent in an intense sweating out that was almost torture. They knew the Americans were coming, but they were not at all sure of the temper of the guards

who they feared might shoot them rather than let them be rescued by the Allies. Too, they could see that it was possible—almost likely—that they would be caught in the cross-fire between rescuing Americans and their Nazi guards.

The kriegies were preparing their slight breakfast when on April 29, the 14th Armored Division of the Third Army swung down to Moosburg. Machine gun and rifle bullets sang through the camp and the kriegies and their guards hit the dirt, and one or two men, lacking caution, raised their heads and saw infantrymen in American uniforms and tanks with white stars advancing on the camp.

The Stalag commandant, a captain in the Luftwaffe, was really scared. When a lull in the shooting came, he grabbed the nearest piece of white cloth he could find, and ran through the camp, out the gate, and down a road, frantically waving his white flag. Taken into custody, he chattered at his captors that he had spent nearly 13 years in the United States. He had always been just and considerate to his prisoners; just ask them, he said. He was just a soldier doing a job, he said. He didn't expect any consideration, none at all, but he had always been a kind man and a good soldier, see. He never had been a Nazi, never; in fact, he didn't even like Nazis. The tankers and the kriegies laughed at him.

The prisoners, some of them in German hands for years, were happy, almost scared, they were so happy. They stayed in the barbed wire-fenced stockade for four more days while details from the Provost Marshal and from the Medical Corps inspected the camp and its occupants. They had solid American food brought to them. Then they fell in for their last formation in Stalag 7-A, and AAF troop transport planes flew them out. In one morning, more than 10,000 were taken to the coast of France to Camp RAMP, abbreviation for Recovered Allied Military Personnel.

In the pictures on this page, T/Sgt. Roger Coster, of the AIR FORCE overseas staff, has caught some of the joy at freedom, the hope of seeing home, and the terrible bitterness toward the Germans felt by these men who saw their comrades die in battle, and also saw them die from mistreatment and starvation at the hands of the Germans.

Thousands and thousands of men have gone through Camp RAMP, and usually they are out of there and on their way home in about three days. They are checked by the medics; refitted with clean clothes, often their first in months or years, and they get their pay brought up to date, a tidy sum for men imprisoned for eighteen months or more.

Refitted, shaved and showered ex-POWs wait for PX ration cards near pile of de-loused clothing that had been worn in prison camps.

Now, after a long, long time of being kriegies, anonymous and miserable, they are back in the AAF again—sergeants, flying officers, lieutenants, captains, majors and colonels. They are getting back much of the weight they lost. They never lost any of their spirit.

☆

Here is what some lately-rescued American prisoners of Germany had to say as they landed at Camp Ramp on the French Coast:

German Thinking

Col. Darr H. Alkire, 15th Air Force, shot down over Aviano, Italy, January 31, 1944: "The Germans were the most gullible idiots I've ever encountered. Regardless of their rank or background, they had no opinions except those outlined by Goebbels. They always complained that we bombed indiscriminately and that we had no cause for entering the war."

The AAF

Lt. Garrett R. Thomas, P-38 pilot shot down over Yugoslavia, May 29, 1944: "Our Air Force was a constant threat to the Nazis—and to us. On marches we were forced to watch continuously for fighters. If we stopped for chow or rest, they would appear almost immediately. They made it impossible for us or anyone else in Germany to relax."

Precision Bombing

Lt. Lawrence Townsend, B-17 pilot shot down over St. Lo, July 25, 1944: "I've marched through cities where railroad yards and factories were completely wiped out, and houses and churches a few hundred or thousand yards distant weren't touched except by concussion. In one Stalag we were near railroad yards, and the bomber boys tore the rails to hell but not a bomb fell near us."

What Airborne Joes Think

Pvt. Michael Dziezgowski, 82nd Airborne Division paratrooper captured near Nijmegen, Holland: "We kid the Air Forces plenty, but they can take it. We're partners. The Troop Carrier pilots have taken us 82nd jumpers into some plenty rough spots—Sicily and Salerno, to name a couple—but every time they've stuck with us all the way. In Holland, they went through terrible flak and dropped us as close as guys can be dropped."

The Red Cross

Sgt. Davis Mulliner, 15th Air Force aerial photographer shot down over Bucharest, August 26, 1944: "I don't think any of us could have held out if it hadn't been for the Red Cross and our Red Cross parcels. They brought us our only American cigarettes and chocolate and reminded us we were still in contact with home. When bartering for eggs and other luxuries, we found the cigarettes and other items worth a hundred times their regular value."

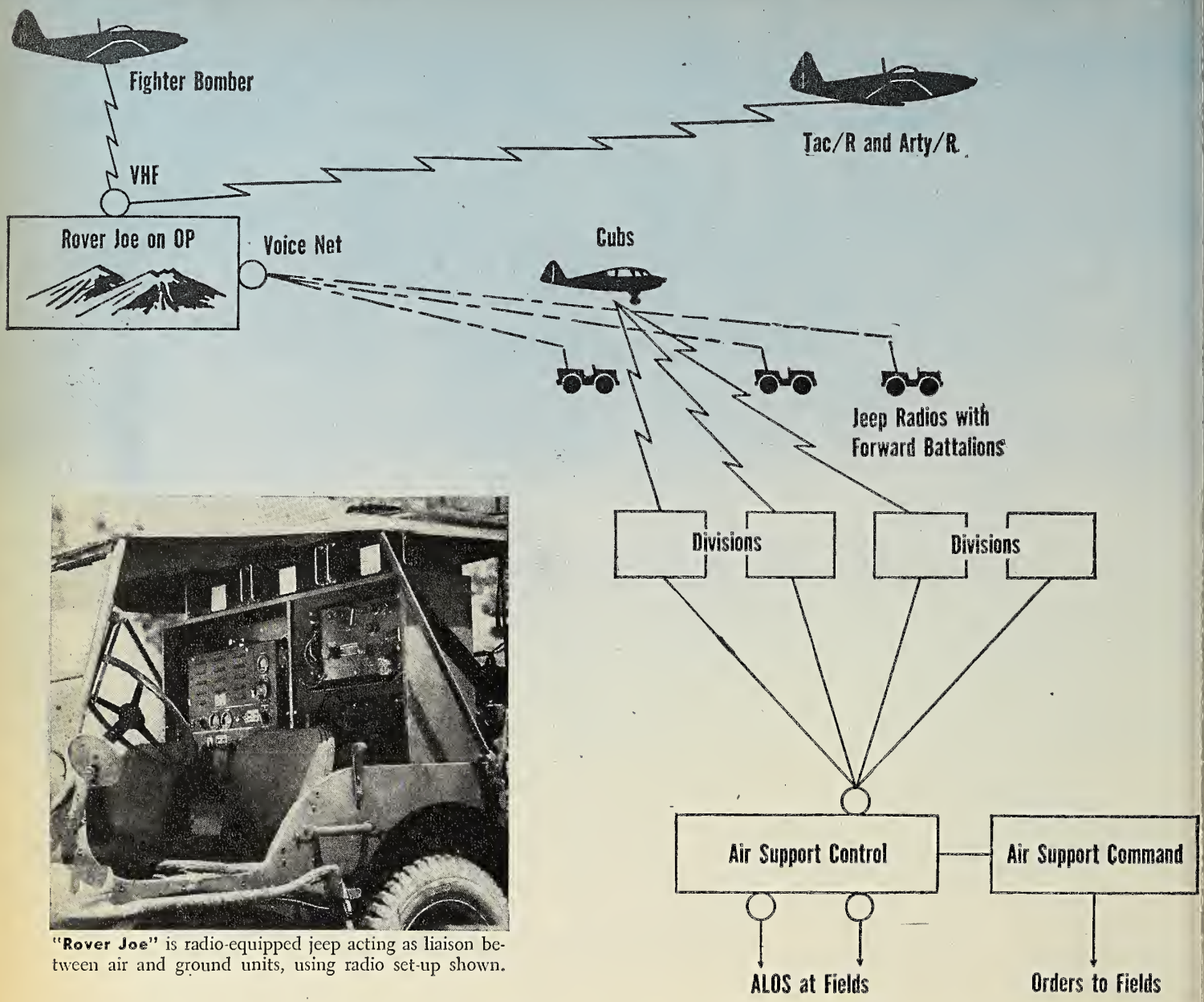
Germans on AAF

Lt. A. P. Howard, P-51 pilot shot down over Giessen, Germany: "The Jerries called us 'terror fliegers' and gangsters, and baby killers, and the goon (German) civilians in some cases were pretty rough with flyers they rounded up. But they knew we were good; we had them scared and the know-how to command respect. What made me laugh was their complaint we weren't playing a fair game. A Luftwaffe officer said they would be glad to fight us but we always sent out too many planes." ☆

technique

Development, Maintenance and Supply of Aircraft and Equipment

Salvage and Reclamation—Page 50



"Rover Joe" is radio-equipped jeep acting as liaison between air and ground units, using radio set-up shown.

"Rover Joe" In Air-Ground Tactics

"Rover Joe! Rover Joe! This is Green 3. What have you got for us?"

"Green 3, this is Rover Joe. There is a machine gun emplacement about ten degrees north of hill 501. Go get it."

"Rover Joe, this is Green 3. Roger, wilco."

Modern ground-to-air radio communication has adapted the childhood game of "Rover, Rover, may I come over," into one of the most spectacular types of air-ground cooperation yet developed by military necessity. Especially suited for operations in mountainous terrain, "Rover Joe" is a radio-equipped jeep that is well to the fore of advancing ground troops, and controls a visual sector of the front line. When reconnaissance patrols report the presence of an enemy strongpoint or fortified position that may be vulnerable to air attack, Rover Joe immediately makes contact with Tactical Air Force ground-support planes and guides the bomb-carrying fighters directly to the target. The speed and coordination with which results may be achieved surpasses any other form of AAF-AGF collaboration, and frequently the interval between a regimental request and the peeling off of strafing planes over a target is less than 15 minutes. Accuracy, too, is set at a high standard, and well over 600 Rover Joe sorties were recently flown to within 500 yards of our advancing troops without a single error being committed.

Although this type of "special request" service is a common occurrence under fluid battle conditions, the fundamental basis for the overall operation is carefully laid out 24 hours in advance at the regular daily meetings between Ground and Air. At this time, prearranged targets are agreed upon and schedules of alternate or secondary objectives are drawn up in accordance with their relative importance. As the forward controller, Rover Joe has this plan, together with the necessary maps, charts and other data, constantly before him, and it is on this timetable that he directs close cooperation missions. Meanwhile, the pilots of the fighter planes have been thoroughly briefed on the targets they are to attack, and at the scheduled time the craft are airborne and ready to make their sweeps. As they approach the front lines, radio contact is established with Rover Joe, and the planes are

"talked" onto their objectives.

With the enemy falling back rapidly, a number of L-type planes may be sent up to assist Rover Joe in observation and also to act as intermediaries to facilitate control. To simplify the procedure they are painted different colors and referred to as "Horsefly Red" or "Horsefly Yellow" as the case may be. Each craft has two men in it, and both observer and pilot are usually experienced combat men—the passenger being an Air Officer of the division being supported. Like Rover Joe, Horsefly is responsible for the proper description of the target and for guiding the fighter planes to the objective, and over a communications network embracing ground and air headquarters, bombings and strafings are effectively carried out.

"Flying Dutchman" Comes Through

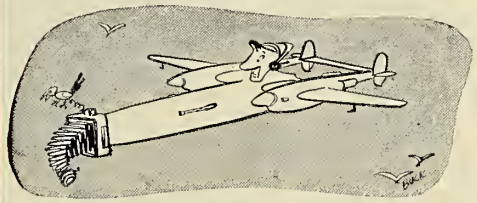
As a graphic sequel to the announcement of the "Flying Dutchman," airborne rescue boat in the August, 1944 issue of AIR FORCE, Capt. W. L. Dawbarn, the very man who expedited production of the craft and who served as its project engineer at Wright Field, was recently called upon to prove the value of his device in a dramatic rescue of six American airmen from the icy waters of the North Sea. On 31 March, 1945, a call came through to the 5th Emergency Rescue Squadron in England, saying that the men had been downed at sea off Denmark and that four attempts at rescue had failed. Capt. Dawbarn, who had taken his boat to the British Isles for a demonstration, was called upon to give the Flying

Released from under a B-17's fuselage, the airborne rescue craft plummets to the sea.

tech topics . . . about aircraft and equipment

A set of gyroscopic instruments has been installed in the YR-6 helicopter to give a level reference for night flying. Installation of an electric horizon indicator and an electric directional gyro indicator make it possible for a pilot to fly the "windmill" airplane in all attitudes in total darkness. Since the airplane has no vacuum system, an inverter system is provided to operate the instruments. . . . Personnel pick-up equipment installed in an R-4 helicopter includes a reel with 50 feet of cable which can lift a 250 pound weight at the rate of 2 feet per second. Several tests have proved the pick-up method highly practical. The device is to be installed in later model helicopters for rescue purposes.

Latest photographic airplanes are the F-5G, Lockheed; F-6K Mustang and the F-13A, a modified Superfortress. A large and extended nose on the P-38 holds new camera installations. The P-51 has three camera ports, two in the side of the fuselage. Photo version of the B-29 has most complete camera equipment of any airplane now in use. It also retains all the



deadly fire-power of a combat Superfortress. . . . Another unique photo installation consists of cameras mounted in the leading edge of the wings on a P-51. Mirrors and oblique lenses permit taking vertical pictures.

Newest and largest aircraft generator can create enough electricity to supply a town of 3,000 people for a full day. It saves about a ton of complicated wiring over other generator systems.

A new type launching device for rocket-firing fighters permits carrying more rocket projectiles than was previously possible. As many as ten rockets can be slung under the wings of a P-51. Before, the Mustang could only carry six rockets in tube installations.

Difficulties in fabrication of metal covers for Generator Control Relays has led to experiments with a plastic cover. Simplified construction and lightweight features may mean that the new plastic covers will replace metal ones.

An experimental combination spotlight and floodlight differs from existing types in that focusing is accomplished by moving the lamp bulb rather than adjusting the lens and dimming is accomplished by rotating a polaroid filter in lieu of a rheostat. These features adapted to cockpit lights will reduce their size and simplify operation.

AAF personnel overseas, who long for a good hot or cold shower will get just that when tests are completed on an engine-driven portable shower now being fabricated. Having a capacity for 90 gallons of water per hour, the machine is portable by air, will be shipped to advanced bases.

To guard against fungus attack a plastic lacing cord for use in binding harness bundles is being tested. The cord, highly resistant to fungus growth, possesses a tensile strength of 2,500 pounds per square inch.

To provide permanent records of altitudes during all training flights, a new type barograph has been designed for installation in all training aircraft. The barograph (Type B-2) is an aneroid instrument and records pressure altitudes from 1,000 feet below sea-level to 50,000 feet in the stratosphere. . . . AT-6C and AT-6D training airplanes have been modified as blind flight trainers. Additional blind flying instruments have been added to the rear cockpit instrument panel. Approximately 400 of these airplanes with the new cockpit arrangement are to be made available for training purposes.

The versatile jeep, which does everything but eat hay, now is being modified as a fence cutter. An electric motor-driven reciprocating shear mounted on the front bumper snaps off fence wiring with scythe-like action.

Modifications on the Air Position Indicator have more than doubled the life of this instrument for low-temperature operation. The "X" design includes a new air mileage pump having hardened steel gears with 50 per cent increased thickness and bevel gears in place of helical gears on the standard instrument. Life of the experimental model is estimated at 800 hours continuous operation in temperatures at —54 degrees C. with twice the normal rated load on the instrument.

Three parachutes open to ease the descent of the "Flying Dutchman" to the life raft.

Dutchman a realistic trial, and within 55 minutes the craft had been hooked onto a B-17 and was in the air without even pre-flighting the plane.

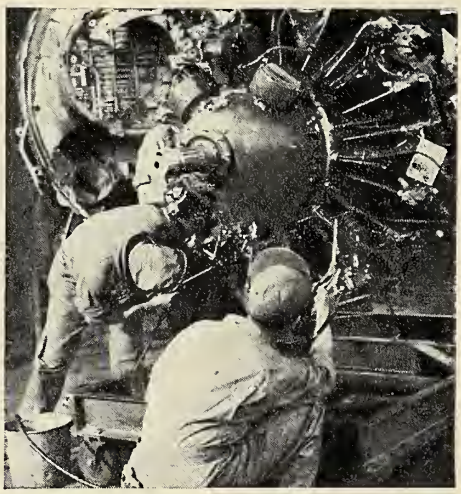
Two hours later, the bomber was over the scene of the crash and was hovering around at 300 feet trying to keep the men in sight. Four P-51s flew escort cover to keep away German jet planes who were reported in the vicinity, and the Mustangs made several dives at the life-raft to guide the Fortress directly over it. Smoke bombs were dropped, but were ineffective due to the 35-mile-an-hour wind and the 8-foot waves. After several dry runs, however, it was decided to take a chance, and on the next turn the boat was cut loose. Almost immediately the tail gunner yelled over the interphone that the parachutes were open and that the Dutchman was drifting over the survivors. By a slight miscalculation it landed 120 feet upwind of the raft, but fortunately one of the three rocket lines went right over the head of the men and they just reached out and grabbed it and then pulled themselves into the boat.

With the men finally safe in England, their story proved the boat's great value. They had gotten both engines started and had headed home, following the course laid down on the chart in the rescue craft. Encountering a severe storm, they plowed on for 33 hours until their fuel gave out. Then they cast anchor, weathered the gale and were picked up by a torpedo boat that homed on the rescue craft's Gibson Girl distress signal.

The rescue operation was the first instance wherein a project engineer of a particular piece of equipment was able to see his "baby" prove itself from start to finish.

Salvage and Reclamation

In connection with a world-wide AAF conservation, salvage and reclamation program, the Second Air Force has taken action to make all of its bases acutely aware of the urgent necessity for achieving the maximum conservation of all items of supply through correct and timely maintenance, efficient reclamation and thorough utilization. Results obtained are expected to ease procurement problems, increase supplies of critical items, reduce storage of supplies in Zones of Interior and release urgently needed material to theatres of operation.



Mechanics clean the cylinders of a salvaged Thunderbolt engine before its re-installation.

According to Brig. Gen. Harold A. McGinnis, deputy chief of staff, maintenance and supply, 2nd Air Force, progress of the salvage activities has already doubled the previous level of savings, and when the drive has been in operation several months more it is anticipated that maximum economy of material will be attained.

At overseas bases it is axiomatic that no crashed airplane that can be reached by a salvage crew ever goes to waste. Planes are hauled back, whole or in part and repaired or cannibalized. Operating around the clock, reclamation crews cut rivets, remove screws to extract usable instruments, take off turrets, landing gear, interior equipment and the Dural skin of the craft itself. Cables, pulleys, fairleads and wires also are fed back into supply.

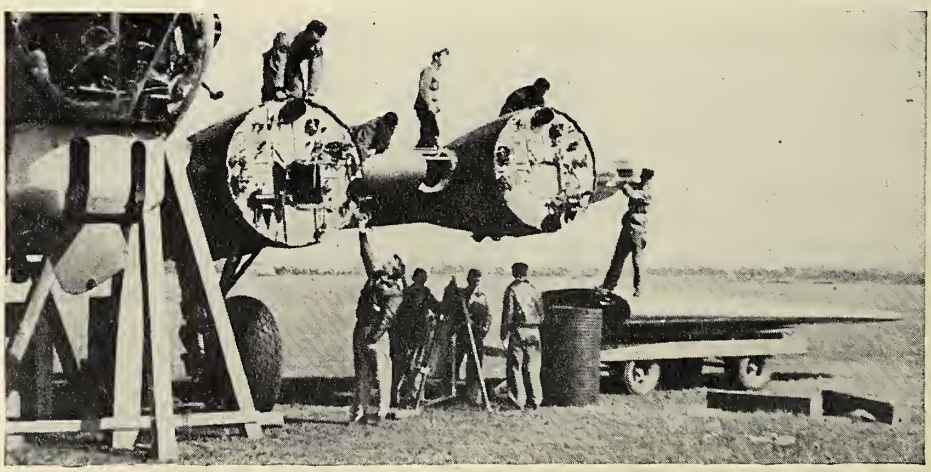
Completely stripped skeletons are taken to Quartermaster salvage yards for shipment back to the States where their metals go into new planes.

In the 8th Air Force alone, it has been estimated that over $120,000,000 has been saved for the AAF by such operations. An important phase of the work is the reclamation of unused .50 caliber ammunition (see Technique cover) taken from damaged planes.

Wing Repair by Aircrew

A group of American airmen, interned in Sweden when their B-17 made a forced landing on neutral territory, have been able to accomplish a complete wing change on their Flying Fortress, using parts from an aircraft scrap pile and the few tools they were able to obtain locally. Although trained for flying and not for ground echelon maintenance, the men have performed a job that would have done credit to any repair depot.

It all started a few months ago when Flying Fortress No. 42-39994 limped into a little airfield in southern Sweden, with its left wing the victim of a 20 mm shell. Both engines were knocked out and the main spar was seriously weakened, but the pilot was able to bring it in without further damage. For some time the plane rested where



These airmen, interned in Sweden, are adjusting a new wing panel on their Flying Fortress which had been damaged in combat and was forced to make a landing on neutral territory.

it had come to a stop, but when other crippled bombers also found haven nearby, it was decided by members of the crew that with an undamaged wing available, their B-17 might be repaired and made airworthy once more. Accordingly, a complete panel was salvaged from one of the refugee planes, some interned flight engineers were recruited for technical assistance, a few tools were borrowed from a nearby airline and work began.

T/Sgt. William E. Gregory, who had had some previous factory experience with wings, was put in charge. The first phase of the operation was the removal of the usable left wing from a wrecked Flying Fortress, and this was done by jacking the fuselage up with home-made cradles and chocks and removing the landing gear and outer wing panel. The inner wing was then supported by means of barrels placed end on end, while a truck was parked under the wing between the supports in order to receive the wing as it was gradually lowered.

Next came the job of removing the battle-damaged wing from their own bomber, and this was accomplished by means of an overhead hoist consisting of two ten foot high uprights and a connecting cross beam with ½" flexible cable in a block and tackle. Using this improvised hoist at the inner end with an engine hoist at the outer end, it was possible to lower the wing without damage.

To place the useable wing in position, the same equipment was employed, with the engine hoist at the outer end located so that the wing could be swung inwards after it had been lifted. Taper pins were then inserted to hold the panel in place, and although old pins were used to fill the holes at first, they were later removed, one at a time, and new pins reamed in and secured.

With the wing panel adjusted to the fuselage, the big problems involved were the connection of engine instruments and re-wiring of electrical systems. The instrument picture was complicated by the fact that pressure-types were used in the replacement wing, while autosyn instruments had been used in the original. By cutting holes in the fuselage at the wing root, however, salvaged pressure lines were passed through to the pressure-type instruments from the scrapped airplane, which had been installed in the cockpit, and efficient operation was achieved. Wiring difficulties were overcome through the use of special test-

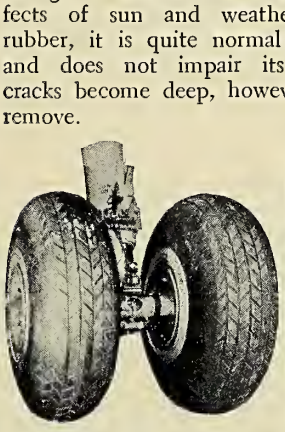
maintenance tips . . .

from the crew chief's stand

Airplane tires may laugh at abuse, but frequently end up with their sides split. To promote a long and happy life for these critical items of AAF supply, pay particular attention to the following points:

1. Keep runways clean and free of abrasive material, bits of metal and glass. Watch for chuck holes and fill at once.
2. Change tires when tread becomes barely visible, or cuts, breaks or blisters appear.
3. Tell your pilot to avoid sharp turns or skid burns unless the safety of the plane is endangered.
4. Inflate correctly according to TO 04-10-1.
5. Cover tires with anything available when working on engines, to keep fuel and lubricants away from the rubber.

If synthetic tires are in use, don't rush for the standard S-1 tire removal kit merely because a few landings have resulted in "checking" in the sidewalls. Although the condition resembles the effects of sun and weather on natural rubber, it is quite normal for synthetics and does not impair its strength. If cracks become deep, however, be sure to remove.

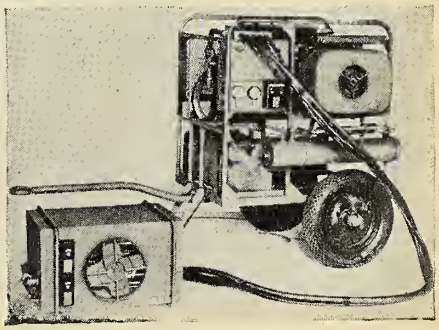


On dual wheel gear, inflate tires evenly to the same height. Also, use tires of identical manufacture and degree of wear, if possible. With dual nose gear, use regular inner tubes, since double seal tubes are reserved for single wheel installation.

Stat Control speaks volumes where interchangeability of parts is concerned, and a never-before-published AAF numerical index for property classification is now available under S-00-1 on form 65-507. The parts index uses the same numbers as those in all official stock lists, and also includes inactive items, providing handy reference to more than 635,000 part numbers. Instructions for full use of the series are contained in the introduction to the first volume, and each succeeding volume contains approximately 200 stapled sheets for inclusion in standard TO binders. Cumulative monthly additions, numbers S-00-1A, -1B, etc., will supersede previous addenda and list new items and deletions, while volumes of the basic publication will be reissued whenever the size of the addenda requires.

Take an oil cooler flat actuator power unit G.E. model No. 5BA25HJ16A from a wrecked P-38, a ⅜" x 8" plumb socket wrench extension WF-18 and a type B-11 toggle switch assembly — put them together in the proper proportions and you'll be the pleased user of a combination electric screwdriver and socket wrench. The salvage tool, which is suggested by Cpl. James F. Vystercil of an 8th Air Force Service Command Unit in England, may be made by following a few simple directions. First, remove the relay box and the worm drive from the actuator and take off the outside shield from the worms, disconnecting the wires. Next, take the socket wrench extension and lathe the female end to ⅝" and drill a 3/16" lock hole through the shaft. Insert the shaft so that the male end extends through the smooth end of the brass tube shaft, drill a 3/16" hole through the threaded end of the tube in line with the hole in the extension, and lock the two parts with a 3/16" steel pin. To make a handle for this part, seal the end of the shield and mount it over the threaded portion.

A limited number of the portable air coolers designed for ground cooling of B-29 interiors may be made available to some air evacuation units operating in hot climates. The apparatus is believed to be satisfactory for cooling evacuation aircraft during loading, unloading, and servicing. Requirements and priority for the cooler should be established through the usual AAF supply channels. Official designation is Cooler, Portable, Airborne, Type A-1, specification No. 40742, Stock Number 8200-17200, and it is supplied by Class 19E of ATSC.



ing instruments made from discarded radio parts by T/Sgt. Victor R. Marcotte and S/Sgt. James C. Curtis. And after superchargers had been replaced, fuel cells repaired, engines mounted and landing gear installed, Flying Fortress No. 42-39994 was pronounced fit for air travel and successfully test flown.

In addition to those already mentioned, special credit for their part in the job goes to S/Sgt. Bailey E. Kelly, S/Sgt. Donald S. Courson, T/Sgt. Jerome Wodin, T/Sgt. James J. Duggan, S/Sgt. Ziggie L. Lozlosky, S/Sgt. William E. Marr, S/Sgt. Raymond J. Long, T/Sgt. William B. Quimby, S/Sgt. Matthew C. Schmitt, S/Sgt. Manuel J. Silva, S/Sgt. Louis Stokosa and S/Sgt. Wayne A. Peterson.

Quick Color Printing Process

Not long ago, a B-25 fresh from the assembly line had to make a forced landing. Inspection revealed a smudge-like substance on an engine part, and a photographer from the Photographic Engineering Branch, Technical Data Laboratory at Wright Field was flown to the scene to take pictures of the suspected part. In 80 minutes after his return, the first color transparency was ready, and three hours later, 25 color prints were on their way to various engineers for study. Thus, within a phenomenally short time, color prints were made available for technical examination and the bomber was able to be repaired and released for its combat assignment without further delay.

The new printing process, which simplifies color reproduction techniques to the point where they are comparable to those used in black and white pictures, is called "Gaspareolor," after Dr. Bela Gaspar, its inventor, and not only saves time, but affords more detail and color fidelity in the prints themselves. The paper used is a monopak with dyes incorporated in three emulsion layers on an opal acetate base. After a single exposure from a color transparency, the paper is developed like any black and white print, while red, green and blue light, imposed on the paper by the color transparency, is recorded in each emulsion layer as a negative silver image. The next step is a dye bleach bath which destroys the dye wherever there is a metallic silver or negative image, thus leaving a positive print with true colors. Because a new type of dye destruction method is used in each emulsion layer, Gaspareolor is more brilliant in hue than a process which relies on dye coupling. The image is exceptionally sharp and the rendering of highlights and shadows is particularly accurate.

At present, the AAF is using Gaspareolor to assist in the aircraft engineering and manufacturing program, but other developments of color reproduction methods will find broader applications in general Air Force photographic requirements. As an engineering aid, the technique has proved itself of great value in recording various stages of metal corrosion, showing the effects of incendiary bullets on airplane hydraulic fluid containers by indicating the elements of combustion, and illustrating the results of different cleaning agents on metal parts. In addition, it reveals the fading of camouflage materials and paint finishes after periods of exposure to sunlight or ultraviolet light, and gives a means of color contrast in studying icing conditions on propellers, wings and engine nacelles.

Vital researches in aero-medicine have been advanced, too, by the reproduction in full natural color of physiological subjects, such as the pallor of a man being whirled in the centrifuge, the irritation caused by various toxic agents applied to human skin, the manifestations of frostbite due to exposure at low temperatures, and the characteristics of injuries from gun shots or flak. Numerous charts and graphs in coded colors, which formerly had to be reproduced in quantity by hand, are today being made at a fraction of the cost and in much less time.

what's wrong with this picture?

Keep this under your wing, but the four men shown playing with firepower are making a mockery of rocketry. Six of these projectiles are clearly visible and there's at least one boner being pulled for each. Before drawing a bead on Page 55, however, for a side-by-side bracketing of their errors, train your sights over every detail and you might find a few more misfires. The wrong-doers, who are better actors than cautious crewmen, are (from left to right) M/Sgt. Julian S. Pollard, S/Sgt. James E. Brooks, T/Sgt. Charles J. Lamb and Pfc. Robert O. Thomas, all of the 4000th Base Unit, Wright Field.

Paratroops hit silk over proper drop zone as cockpit "Viewer" guides pilot on course.

Flight Strip Viewer

Pilots who fly troop carriers in paratroop and airborne infantry operations, are to have a special device riding with them in the cockpit which will provide a continuous briefing right up to the drop zone. The new equipment gives a moving picture of the terrain below, from take-off to "jump" point, enabling flyers and navigators to reach positions with great precision.

The Flight Strip Viewer is a streamlined box which contains two rolls of positive transparencies which pass on rollers over two fluorescent screens. One screen shows a vertical view of the ground below, while the other shows an oblique view of the terrain directly ahead. By glancing at one and then the other, a pilot can easily check and maintain correct position. The fluorescent screens give the transparencies a low-level illumination simulating moonlight, and also produce a third-dimensional effect, while a course line is painted on the transparencies to serve as a guide to the exact dropping point.

The viewer fits snugly into the throttle quadrant between pilot and co-pilot, and the film runs at a speed range of between 50 to 400 miles per hour, in accordance with the speed of the plane. An electric motor runs the film over the rollers and is synchronized to the throttle to achieve this result, while manually operated knobs permit adjustments for tail winds and other flight factors. Transparencies for the viewer are made from high-altitude photos taken by recon squadrons. Various check points, such as roads, streams and rock formations are marked with a special fluorescent chemical which makes them stand out clearly, and mileage indices on the edge of the film tell the pilot the actual distances to the target at all times.

The apparatus was developed by the Equipment Laboratory engineers, ATSC, and has already been tested by more than 100 combat pilots who are unanimous in its praise. It will soon go into production, along with several modifications for use in high altitude bombardment and for use with radar in either contact or instrument weather.

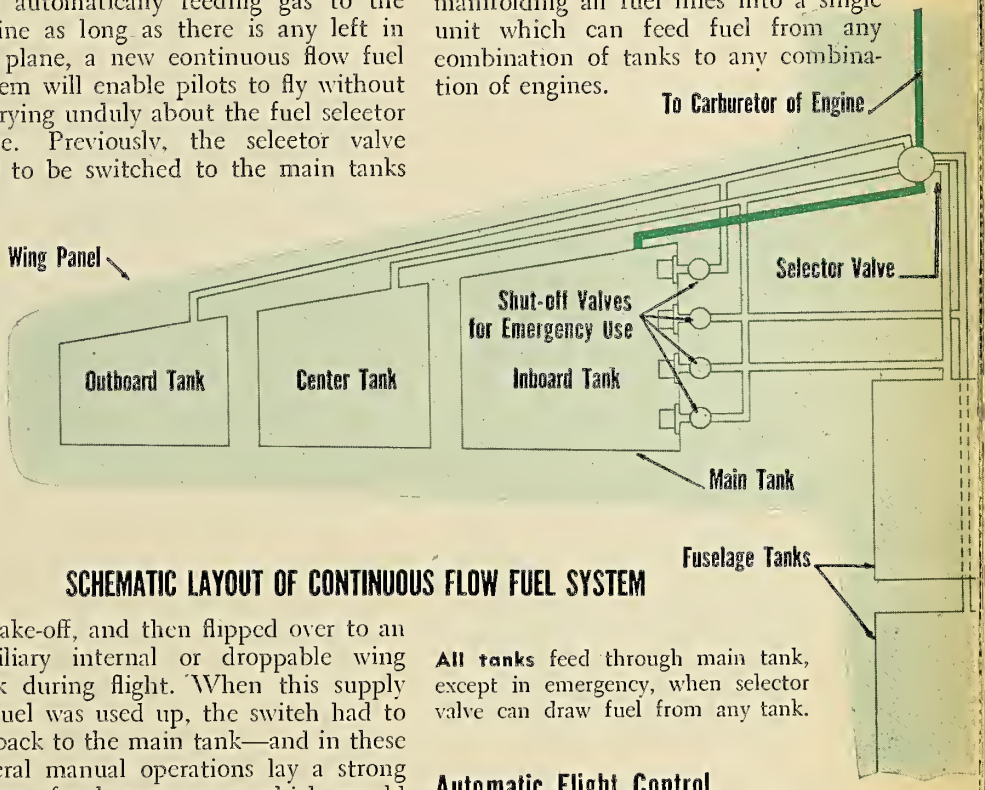
Continuous Flow Fuel System

Maintaining a maximum supply of fuel in the principal tanks at all times and automatically feeding gas to the engine as long as there is any left in the plane, a new continuous flow fuel system will enable pilots to fly without worrying unduly about the fuel selector valve. Previously, the selector valve had to be switched to the main tanks at take-off, and then flipped over to an auxiliary internal or droppable wing tank during flight. When this supply of fuel was used up, the switch had to go back to the main tank—and in these several manual operations lay a strong chance for human error which would place a plane in serious trouble.

To guard against such contingencies, the new system pipes all fuel through the main tank and then into the engine. A series of fuel-level valves inside the main tank automatically feeds the gasoline in proper sequence from each auxiliary tank, and as long as any fuel remains in these auxiliaries, the main tank will be full. This means that a pilot can jettison his wing tanks at any time and still have maximum fuel in the main tank and built-in auxiliaries.

The fuel level valve floats on top of the gasoline in the main tank, and when the supply drops below a certain level it automatically opens to allow the tank to be refilled by flow from auxiliaries. Booster pumps, similar to those used in conventional systems, eliminate the danger of vapor lock by pressuring the fuel through pipe lines, while the selector valve has an emergency stop which permits fuel to be piped from any tank direct to the engine. This latter device is a safety mechanism that is operated manually and is used only when the main tank is damaged or when the system becomes defective.

Although installed initially in P-47s, a comparative system has been worked out for the A-26 and may also be adapted to other twin-engined planes, using one unit for each engine, with cross-feed lines. In the case of the B-29 and other multi-engine planes, the same results have been achieved merely by manifolding all fuel lines into a single unit which can feed fuel from any combination of tanks to any combination of engines.



SCHEMATIC LAYOUT OF CONTINUOUS FLOW FUEL SYSTEM

All tanks feed through main tank, except in emergency, when selector valve can draw fuel from any tank.

Automatic Flight Control

Designed for use on heavy four-engined bombers, including the B-29, a new one-hand electronic "control stick" now permits pilots to fly their aircraft with an ease and accuracy hitherto unattainable even in the smallest planes. Called a formation stick, the control is a pistol-grip lever about ten inches long mounted with an arm rest beside the pilot. It is free to move in all directions in exactly the same manner as the joy-stick of fighter aircraft, and through electronic amplification and the servo motors of the control surfaces, it turns the plane in the same direction—and in the same proportion—as the stick itself is moved.

In turbulent air, with planes flying a 'tight' formation, both pilot and co-pilot have to exert their full strength to hold their plane on a steady course. With the new Automatic Flight Con-

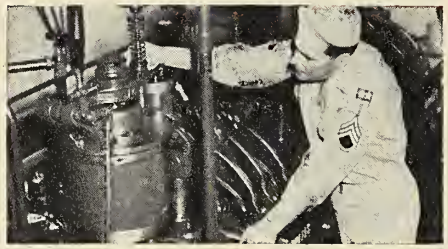
on the line

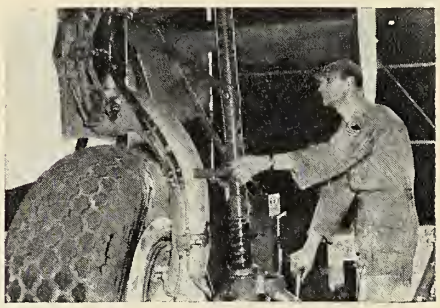
with mechs around the world

Reports from the 12th Air Force indicate that the new technique of mounting a K-25 camera on a special bracket under the wing of a fighter plane so that pilots may photograph their own bombing strikes (see Technique, January, 1945) has been received with enthusiasm by group and unit commanders. By means of the installation shown above, photo-interpreters now have a measuring stick for scoring the work of fighter-bombers, and are able to make accurate, rapid bomb damage assessments on targets attacked during actual hostilities. The location of the camera, the mounts, cowling and wiring were the work of T/Sgt. Graydon G. Branch and Sgt. John C. Stine, both assigned to a MAAF Air Service Group. Shown in the picture is M/Sgt. (now 2nd Lt.) John H. Haynes, College Park, Ga.

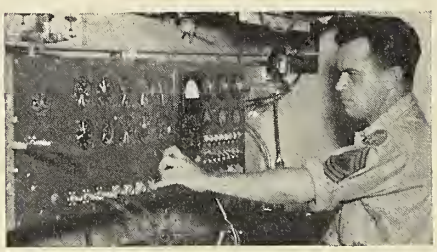
This back-type boat and jungle kit container, demonstrated in a P-38 cockpit by its designer, M/Sgt. Paul Seaton, foreman of the parachute department of a 13th Fighter Command base in the Pacific, permits pilots to fly on long missions without experiencing discomfort and fatigue. The container allows the pilot to sit on a cushion rather than the hard boat formerly used, and lowers him three to four inches in the cockpit so that he doesn't have to bend over for head clearance. The new location cuts wear and tear on boat and jungle equipment to a minimum, and affords a cushion effect back-rest with little or no chafing. It is neatly packed and is tied to one static line. Also, since the bottom of the container rests on the parachute cushion, there is little weight on the shoulders.

Having orders to repair the pump of the air raid warning system of his base in India, S/Sgt. William W. Lemke, Chicago, Ill., found that he did not have the necessary spare parts. Scrounging around among scrap piles, however, he was able to find enough odds and ends to enable him to completely rebuild the defective machinery. After 3,000 hours of operation, the pump was still functioning.





When scores of B-24s began arriving at an ASC depot in England, all requiring the removal of their landing gear struts for a bearing race modification to keep the bearing retainer from slipping, mechanics were compelled to clamber on wooden platforms, propped under the wings, in order to remove the 620-pound struts by hand. To speed up this modification, M/Sgt. Fred Covert of Corsicana, Texas, designed a landing gear strut remover jack (shown above) which enabled two men to do the work of five—in less time and with greater safety. Salvaging a hydraulic finger-lift jack mounted on four rubber wheels, Sgt. Covert constructed several steel sections, which, when fitted onto the jack, gripped the strut and lifted it so that a man could remove the retaining pin. The entire strut was then lowered and taken away for repair, permitting l.g. brake inspection as well.



This master electrical test panel, according to personnel of the 15th Air Force in Italy who have benefitted from its installation, can do anything except talk. It was made by M/Sgt. Earl L. Harris, Baldwin Park, Calif., shown conducting test.

The Pistol-grip swivel and arm rest on the automatic flight control stick help reduce pilot fatigue on long over-water missions.

trol, small but powerful booster motors take the place of muscles, and flyers are able to achieve a 100-pound pull by moving the formation stick with a one-pound force. The instrument not only greatly reduces pilot fatigue and makes possible tighter formation flying, but also simplifies the task of evasive action, wherein changes of flight direction are frequently made.

The formation stick was developed jointly by the Air Technical Service Command and the Minneapolis-Honeywell Regulator Company, and its design was based on an engineering combination of the C-1 automatic pilot and the latest bombsight. Borrowing something from each, with innovations in electronics, the instrument is gyro-stabilized, with sensitive meters and relays to transform the slightest touch into action. After a normal take-off and a flight on automatic pilot, if the flyer wishes to change course or altitude, he merely presses the button on the stick and the craft is completely under his control, operated almost effortlessly by his fingers on the swivel.

Oxygen Warning System

Combat experience of heavy bombers flying high altitude missions has demonstrated that the interphone system of conducting periodical oxygen checks is not always reliable, and at the suggestion of the 8th Air Force, a central warning system has been developed to provide immediate information on the physical well-being of each member of the crew. By combining the functions of the Type T-1 Oxygen Combination Indicator and the Oxygen Central Warning Panel, the monitor of the panel can see at a glance when the respiration of a particular

airman has fallen below normal, when he has become diseonnected from his oxygen supply or when his oxygen regulator is malfunctioning.

The Oxygen Combination Indicator is a composite instrument incorporating a pressure gauge and a flow indicator within a standard size aircraft instrument case. On the face of a single dial, pressure is indicated by a pointer in hundreds of pounds per square inch, while flow is shown by a whirler disc, the luminous sectors of which rotate alternately into and out of view with eaeh cycle of respiration. In addition, the instrument contains an electrical contact switch assembly which makes and breaks a complete circuit with each breathing cycle, and activates the Central Warning Panel accordingly.

The Central Warning Panel comprises a time delay mechanism and a series of warning lights arranged in the same pattern as the plane's oxygen stations—one light for eaeh crew position. This time delay circuit is so arranged that when a crew member suffers an attack of anoxia, the warning lamp associated with his position will instantaneously become lighted, giving a visual indication that emergency action is to be taken.

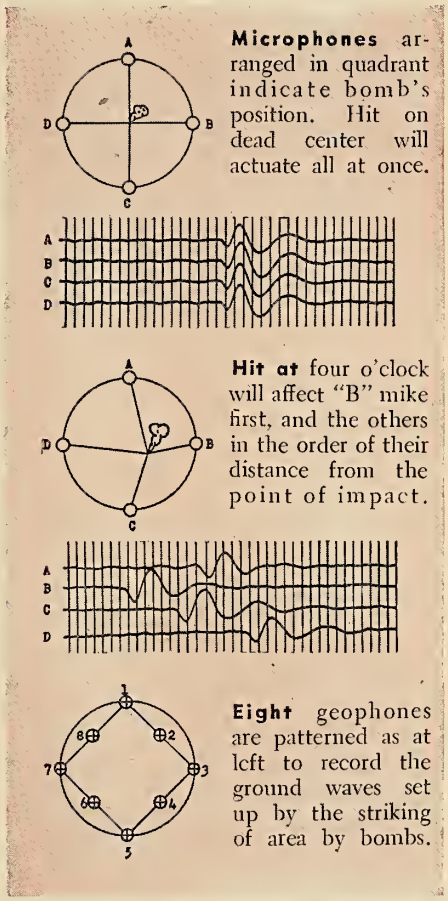
Soon to be released as standard equipment, the warning panel is intended for installation in the navigator's compartment. It is designed, however, to be connected in any dual compartment of the airplane.

Bomb Scoring Training Method

A revolutionary method of scoring bomb hits in bombardier training by means of a sonic device and a "hyperbolic scoring board," has now eliminated human error in the recording of practice bombing results and saved the AAF thousands of dollars formerly spent annually to purchase camera equipment and film.

In sonic scoring, four low-frequency microphones are placed around the target in a square pattern, and each microphone is wired to an individual reflecting galvanometer in a recorder some 2,000 feet away. The time of arrival of the sound wave from a bomb explosion is recorded, and thus an indication of the bomb's position is provided. The sound wave from a dead-eenter hit, for example, will arrive at all four mierophones at the same time, while a bomb hit off center will actuate the mike nearest it first, and then the other microphones in the order of their distance from the bomb impaet.

This method of scoring also provides for eight geophones (underground lis-



tening devices) to be set up, one adjacent to each microphone and one halfway between each. When a bomb hits, the resulting ground wave will travel at a higher velocity than the air wave and actuate one or more of the geophones, thus starting the recorder in time to chart the air wave when it reaches the microphones.

The equipment is inoperative until a bomb strikes the ground. Then, by means of an electronic control, the recorder operates for one second and immediately shuts off. For the purpose of bomb identification, a clock-face is automatically photographed at the end of each bomb hit record on a photosensitive tape, and the bombardier in his airplane need only note the impact time of his release with a special stop wateh. Results may then be wired back to a eentral recording and plotting station where the hyperbolic scoring board instantly interprets them on a table-like structure on which hyperbola, or curved lines representing sound waves from each microphone, are drawn after each bomb falls. Where these lines intersect is found the bomb hit, and the measure of the distance from the center of the bomb target range to this intersection gives the margin of error of the bombardier's release.

The sonic scoring device and the hyperbolic scoreboard were perfected by Maj. Edward McKaba at Midland Army Air Field, Midland, Texas, who received the Legion of Merit for his work.

WHAT'S WRONG with the picture on Page 52

1. Starting off with the obvious, under no circumstances should the engine be warming up during rocket installation or removal. Not only should there be no men working around a plane with its engine running, but with the prop turning over, the whole electrical system is "alive" and the slightest mishandling of rockets might set one off.
2. The mechanic who is down on one knee trying to remove the fin bolts may be writing 'fin' to his AAF career, since the removal of one of these 5-inchers is a two-man job. What's more, he should never unfasten the tail bolts first, because the missile may drop down and set off the rocket firing trigger.
3. The master sergeant who is directing operations while using a rocket as a rocker, will find that the weight of authority has bent the fins all out of line, if it doesn't snap them off entirely. And while we're putting our foot down, will the man in the middle kindly lift his shoe from the warhead?
4. Rubbing a rocket's nose against concrete, as the man on the extreme right is doing, is a sure-fire way of kicking off the arming mechanism. And even if he doesn't, dragging it by its fins may cause it to go wide of its mark.
5. With rockets in their sockets, 'tis folly to stand in front of them, like the mech is doing as he adjusts the nose brace on the inner rocket.
6. Coming to the foreground, the haphazard manner in which these projectiles are stacked can easily cause damage to fins, resulting in improper firing.

AAF QUIZ

Here is your monthly brain-twister. Chalk up five points for each correct answer. A score of 90 or above is excellent; 75 to 85, good; 60 to 70, not too bad; below 60, tsk, tsk. Answers on Page 63.

1. K-17, K-18 and K-20 are important tools of one AAF trade. They are
A. *Bombsights* C. *Sun glasses*
B. *Cameras* D. *First aid kits*

2. The P-63 Kingcobra looks like an overgrown
A. *P-40* B. *P-47* C. *P-38* D. *P-39*

3. In AAF language, the abbreviation UR means
A. *Unconfirmed rumor*
B. *Unauthorized reserve*
C. *Upwind range*
D. *Unsatisfactory report*

4. The President of the Army Air Forces Aid Society is
A. *General of the Army H. H. Arnold*
B. *Mrs. H. H. Arnold*
C. *Mr. Robert A. Lovett*
D. *Capt. E. V. Rickenbacker*

5. The 1941 population of Manila was approximately
A. *100,000* C. *700,000*
B. *300,000* D. *1,200,000*

6. Japan's largest aircraft plant is Mitsubishi Rokuki. Where is it?
A. *Tokyo* C. *Nagoya*
B. *Kobe* D. *Osaka*

7. An individual who served outside the U. S. between September 8, 1939 and December 7, 1941, may wear a bronze service star on his American Defense Ribbon.
A. *True* B. *False*

8. The most accurate and deadly type of antiaircraft fire is
A. *Continuously pointed fire*
B. *Predicted concentration*
C. *Barrage fire*

9. An officer is authorized to wear the Good Conduct ribbon he earned as an enlisted man.
A. *True* B. *False*

10. An enlisted man or junior officer will get how much mustering out pay if he has served more than 60 days at the time of separation and has been stationed overseas.
A. *$100* B. *$200* C. *$300* D. *$400*

11. One of the most thoroughly bombed spots in the Pacific prior to its capture by American troops last February is commonly known as "the Rock." What is the correct name of the place?
A. *Fujiyama* C. *Borneo*
B. *Suribachi* D. *Corregidor*

12. The Zeke 52 is a Jap
A. *Twin-engine fighter*
B. *Twin-engine bomber*
C. *Four-engine transport*
D. *Single-engine fighter*

13. The frangible bullet now used in target practice is fired at specially equipped
A. *P-38s* B. *B-17s* C. *A-26s* D. *P-63s*

14. The P-47N has a tactical radius of how many miles?
A. *500* B. *700* C. *1,000* D. *1,500*

15. The principal sources of magnesium, which is being used increasingly in airframes and engine parts, are
A. *Dolomite and sea water*
B. *Bauxite and turpentine*
C. *Dural and milk of magnesia*
D. *Tin and caustic soda*

16. In relation to the wheel of the B-17, the wheel of the B-29 is
A. *Larger* B. *Smaller* C. *Same size*

17. Headquarters I Troop Carrier Command is located at
A. *Stout Field* C. *Maxwell Field*
B. *Barksdale Field* D. *Chanute Field*

18. Maximum wing loading for commercial aircraft is in the range of 40 to 55 pounds per square foot. What is it for bombardment aircraft?
A. *20 to 25* C. *70 to 80*
B. *40 to 50* D. *100 to 120*

19. To the Air Transport Command, one of the important spots of this world is Accra. Where is it?
A. *On the west coast of Africa*
B. *On the Mediterranean coast near Cairo*
C. *On the northeastern coast of Brazil*
D. *On Ascension Island*

20. Identify this airplane.

THE INFANTRY LOVES IT

(Continued from Page 12)

The last bomb run is completed. The P-51s pull away for a look at the target before they come in again, this time for strafing. Now comes the dangerous stage. In a moment our tanks will move up and the infantry will begin an advance up the side of the hill behind the tanks—and the pilots must be dead certain not to strafe our own troops and machines in the thick smoke. The full attack is about to begin.

"Rhinestone to Red Leader. Do you see the panels marking our front lines?"

"Red Leader back. Roger; don't worry, we see them."

"Rhinestone back. Go in and finish 'em off. Give the boys a holiday. The target is still yours, but after the fourth pass we'll begin moving up the side of the hill under cover of your strafing. Watch those dugouts on the north slope. They may still have something up there. Make your runs south to north, or west to east."

"Roger, Rhinestone. Wilco."

The transmission is hardly over before the fighters come whistling in at 350 miles an hour with their .50s blazing. Some infantrymen jump hurriedly back in their foxholes as the empty shell casings shower down. Then, looking sheepishly at their comrades, they smile and turn to watch the show the air force is putting on for their benefit.

Red Leader and his boys are really enjoying their work now. We listen in as the air crackles with their excited conversation: "Good work, Joe. You drove him right through the foxholes."

"Look at those bastards run."

"Hell, don't look. Go in after them."

"There's some about three o'clock, Sam. Go get 'em."

"Say, they're running all over. Hell, watch the north slope. They are firing right at you.

"The hell with 'em; I'll get 'em, Red."

"Look! Look! The whole damn thing blew right up in their faces."

"Damn it, George, I told you to drop a bomb on that hill. There's machine gun fire coming from it now."

"Forget it Chief. I'll get it now."

The planes are circling and diving right over our heads. Puffs of fire are sprouting all over the place, from 150 yards in front of us to the whole top of the hill. Smoke, red tracers and flames are everywhere—on the objective. The ground boys are getting anxious; they want to take part in the show now. The planes have cleared the way for them.

The planes are racing across the hill again. Fires. Smoke. Deafening chatter of machine guns. Cheers. Yells. More smoke. Little spurting clouds of smoke, all over the hill.

Now the troops move. "Rhinestone to Leader. The boys are moving up the left side of the slope. Don't make any passes on the left side of the hill. We are going to throw in a little mortar to keep 'em guessing. Is that clear?"

"Red Leader to Rhinestone. Roger."

This is the real thing now. Full co-

ordination of all air and ground units.

"Rhinestone to Red Leader. Work over that bald spot on the top of the ridge."

"Roger. We'll massage the bald spot for you, Rhinestone."

"Pay attention to those dugout positions, Red Leader."

"Roger, Rhinestone. Next flight is going in on them."

"Red Leader from Rhinestone. That last plane did a good job. There's something in there."

"Roger, Rhinestone."

Red Leader passes along the instructions to his pilots: "Last plane: Hit that area again. Keep a sharp lookout for them running along the trail."

"Watch out for the ground fire, George. They are firing head-on. See if you can get that damn thing."

"That grass fire over on the hill: Japs."

"Look at that devil run for the wooded area. Don't let him get away."

"Which way's he running, east or west?"

"South, south, you dumb bunny. Go get him. Get him. Don't let that guy get away. There he goes, dammit! Go in and get him."

"I got him now. Take it easy. If I don't hit him I'll sure scare him to death."

We have more instructions for Red Leader. "Rhinestone to Red Leader. Our troops just got some fire from the hill, two o'clock from the bald spot."

Red Leader passes the dope along to his boys. "OK, let's get Baldy's friend over there, gang.—Dammit, Sam. That was too close to our troops. I told you not to fire if you don't know where our troops are."

"Hell, I saw them. I saw them."

It goes on and on, for about 15 minutes and then . . . "OK, Rhinestone, we're through. Hope we did some good."

"Roger, Red Leader. You did a swell job. The troops are up three quarters now, and moving right along. Red Leader, can you make a few dummy passes to keep the Nips in their holes until the infantry gets the rest of them."

"Roger; can do. It's good practice."

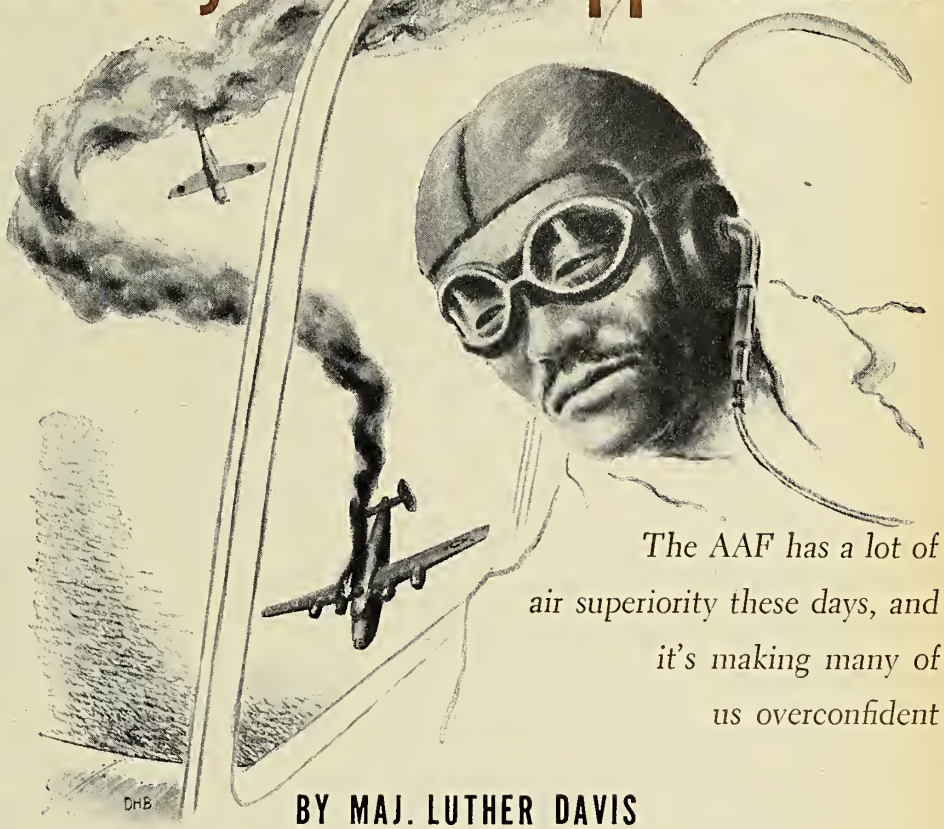
Already 200 Japs have been killed in this air attack, and one ammo dump, three supply dumps and seven to ten machine guns and gunpits knocked out. The infantry is taking the objective without loss of a single life. The majority of the remaining Japs are just sitting in their foxholes, bewildered and dazed—not even knowing the air attack is over until the ground troops go right into them with bayonets. As the infantry mops up, a flight of bombers checks in with us to blast the rear areas and prevent the Japs from moving up reserves and counter-attacking our troops. It's exhausting work. Tough climbing. Close coordination. But our planes on Luzon are doing it every day.

And the infantry loves it. ☆

Answers to "How Sharp Are You"
on Page 2

1. A-20s.	4. None	8. Yes
2. Three	5. True	9. One
3. 37	6. One	10. No
	7. True	

It Only Has to Happen Once



The AAF has a lot of air superiority these days, and it's making many of us overconfident

BY MAJ. LUTHER DAVIS
AIR FORCE *Staff*

There was a long-legged P-47 pilot in Europe who hadn't seen a Jerry plane in months. So he had his crew chief take the armor plate out of his cockpit, moved the seat back and relaxed; they got him with plain, old fashioned small arms fire sent up by the lowly Volksturm. Then there was the briefing officer in India who thought he could reduce his remarks about enemy fighters to the nub: "Fighters? Any fighters you see will be ours." So one of his B-25s which had turned back because of engine trouble was shot down by a Jap plane they thought was an RAF Spitfire.

A P-47 formation leader over Germany decided that we had air superiority—so he called in to his control for a new target. Blithely he gave the map name of the town he was over and gaily reported his exact fuel situation. Jerry got the idea; sent some ME109s to crowd our boys until they ran out of gas, got four P-47s without firing a shot. Similarly, one day in the Central Pacific a B-24 was having navigation trouble. The pilot looked down at that expanse of water and got a little panicky—neglected to use the code word for the island he was trying to get back to. The Japs must have monitored his broadcast, for two Zekes popped up out of nowhere. Back at base they could hear the amazement in the B-24 pilot's voice: "Zekes! Two Zekes at six o'clock!" That was the last they heard.

Lapse of radio discipline has caused a lot of trouble just because it's easier to talk in the clear and it often saves a lot of time to break radio silence. Like a pair of P-51s over northern Italy—the leader called his base to report that his guns were jammed and he couldn't make the strafing attack for which he'd been briefed. Jerry heard too and attacked out of the sun less than 10 minutes after that broadcast. They got away, but just by the skin of their teeth.

Radio laxity accounted for one of the most successful raids the Japs have made on any of our bases. The enemy came in low at just about the time they knew one of our formations would be landing. The warning boys said they'd picked them up all right, but had assumed the planes were friendly. "Hell," said the lieutenant in charge, "if we sounded the alarm everytime we picked up an unidentified plane, we'd be on alert all the time. Strange people are always flying around here."

Naturally, these days, pilots get sloppy about things like recognition flares and signals, and the enemy knows it. A B-17 base in England got bombed and strafed by an unmarked plane that came in with its wheels down. The control tower asked him to identify himself, and he did, but with yesterday's Very colors. Control was satisfied with that — until the bogey started shooting.

As one of our most decorated combat flyers points out, "As the enemy gets weaker, he's going to get cagier. He has to. And we get less cagey. If people would only get it through their heads that it's worth it to each individual to stay on the ball! For the guy who gets shot up—it only has to happen once." ☆

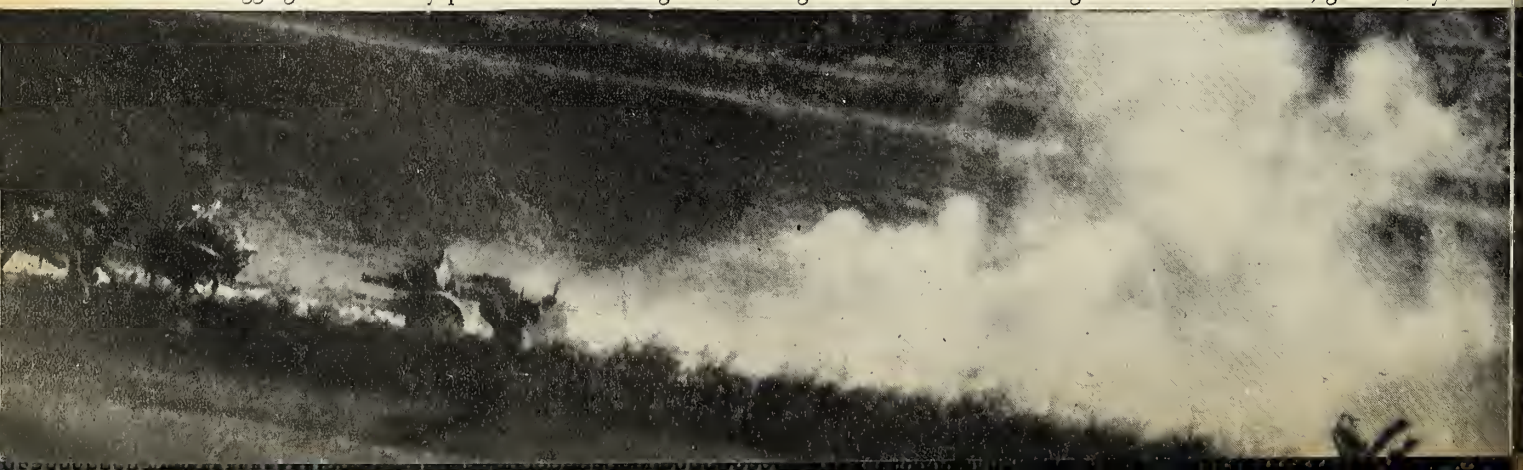
Nazi Retreat

Thunderbolt casts its shadow near German ambulance convoy carrying wounded to ferry point on the Po River. Nazis waved white flag, P-47 did not attack.

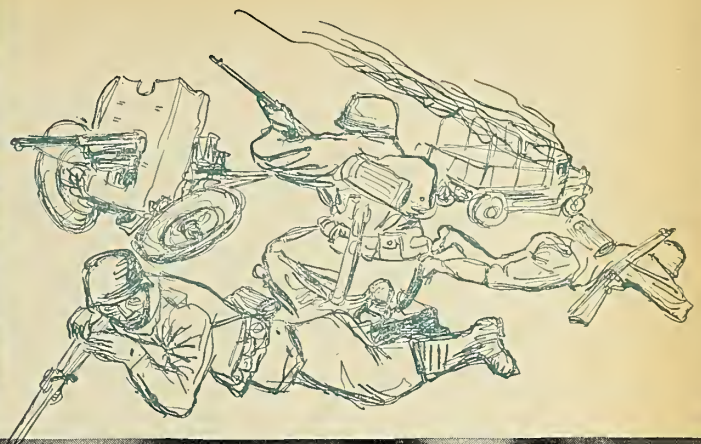
Their lines broken by the Fifth and Eighth Armies, the Nazis in Italy rushed pell-mell for sanctuary in the north, but Allied warplanes that had relentlessly pounded the Hun since Dec. 4, 1942, sought out tanks, barges, carts, trucks, trains of the fleeing Nazis and shot hell out of the retreat

DRAWINGS BY CPL. MILTON WYNNE

Two horses dragging Nazi artillery piece run wild during P-47 strafing attack northwest of Bologna. Horses were killed, gun destroyed.

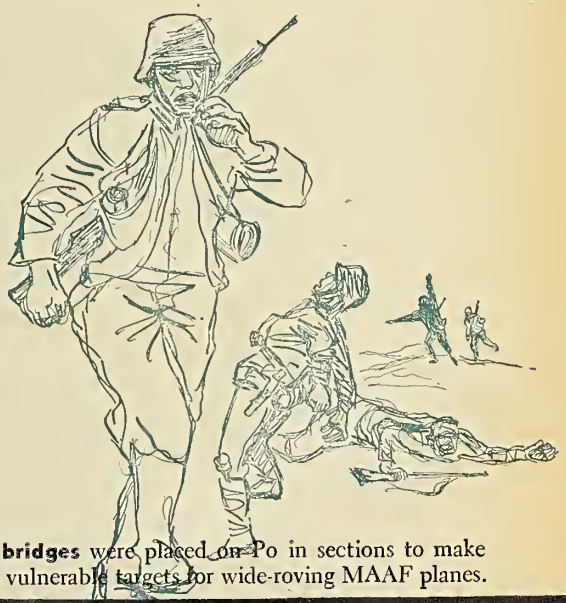


Horse-drawn carts, Nazi truck loaded with supplies are spotted on road.

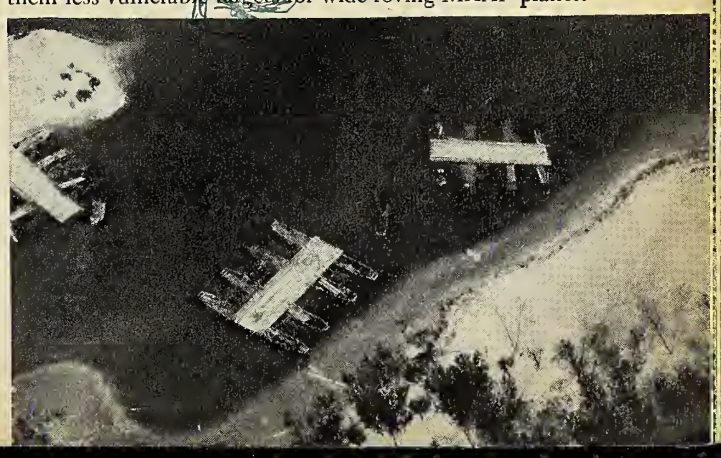


String of Nazi trucks and wagons near Modena explodes and burns after a 12th Air Force fighter attack catches them turning at a cross ro

Nazi tanks, trucks, buses, horse-drawn carts laden with supplies were riddled by P-47s that caught the convoy trying to cross the Tresinaro River.



Pontoon bridges were placed on Po in sections to make them less vulnerable targets for wide-roving MAAF planes.



JOHNNY, GET YOUR GUN—IN SHAPE

A Tip From The Air Inspector

The copilot of a bomber which had been ditched in the Pacific was telling his story after his rescue from an island where he and three other crew members had landed their life raft:

"We found a vacant hut and lay in the brush until a native showed up. He could speak a little English. We told him we wanted food, and he said he knew where there was an abandoned Jap barge with some canned goods in it. We said, 'Lead us to it.'

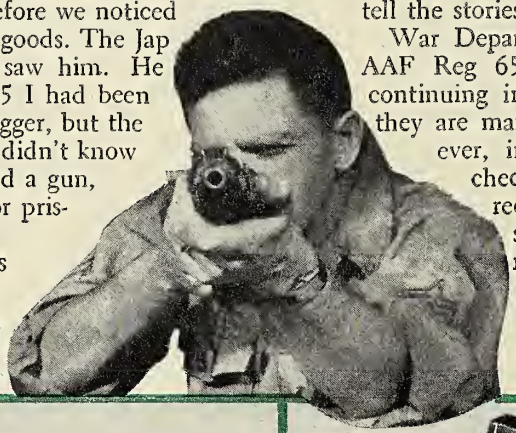
"We were careful in approaching the barge, but had got almost within a hundred feet of it before we noticed a Jap in it filling a sack with canned goods. The Jap saw us about the same second we saw him. He grabbed his rifle, and I raised the .45 I had been carrying in my hand. I pulled the trigger, but the gun didn't fire. It had jammed and I didn't know it. I was the only one of us who had a gun, and I thought we were dead ducks or prisoners, but the Jap began to run.

"The Jap didn't fire until he was out of sight. Then we heard several shots. He was apparently signaling for help. We got out of there fast."

A fighter pilot who had crashed in Alaska's wilds remarked ruefully from his hospital cot:

"I walked in, all right—12 days of it—but I thought I was going to have to crawl on the home stretch. Most of the time I ate nothing but wild berries. For four days, I got along with nothing but water. I eased the ache in my belly by sucking in my guts and patting my stomach. There was lots of small game, but my .45 wouldn't work. I hadn't checked it for weeks. . . ."

These are two incidents of guns that failed because they had not been given proper maintenance. The men lived to tell the stories. But some men don't live.

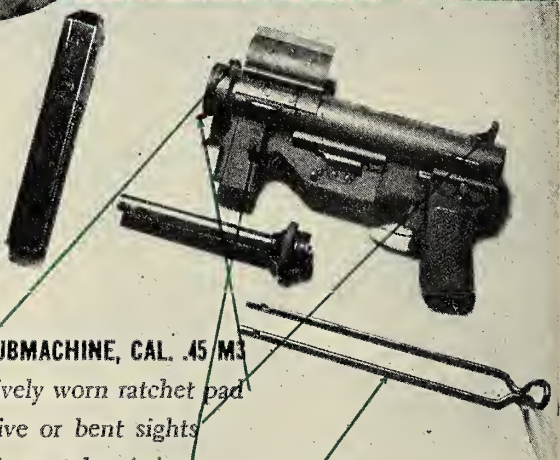


War Department and AAF directives (POM and AAF Reg 65-31) require commanders to schedule continuing inspections of small arms to assure that they are maintained in serviceable condition. However, individuals should not fail to do some checking and maintenance themselves. Guns require regular use of bore cleaner and preservative oil. Deficiencies should be reported immediately.

To aid in checking small arms, here is a list of the most common deficiencies noted in inspections of units preparing for overseas movement:

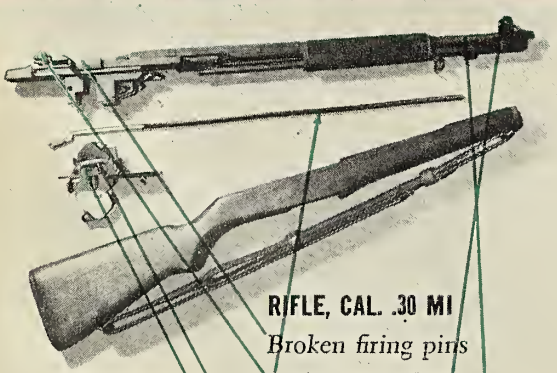
PISTOL, AUTOMATIC, CAL. .45

Damaged barrels
Defective safety locks
Trigger pulls in need of adjustment
Worn disconnectors
Damaged magazines (especially lips)



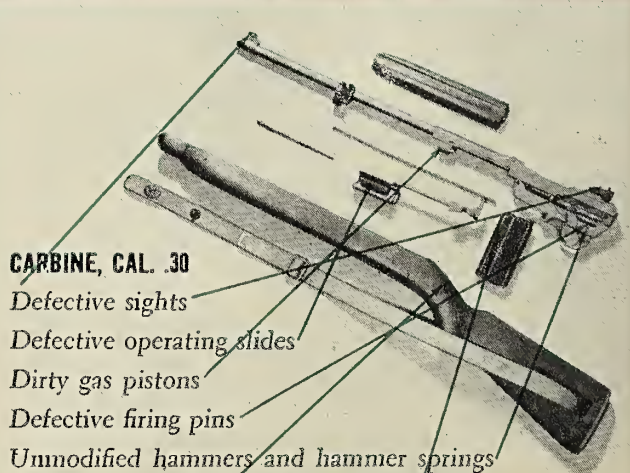
GUN, SUBMACHINE, CAL. .45 M3

Excessively worn ratchet pad
Defective or bent sights
Magazine catch missing
Bent or damaged stock assembly



RIFLE, CAL. .30 M1

Broken firing pins
Defective sights
Loose gas cylinders
Weak operating springs
Tight trigger housings
Loosely fitting trigger housings



CARBINE, CAL. .30

Defective sights
Defective operating slides
Dirty gas pistons
Defective firing pins
Unmodified hammers and hammer springs
Damaged magazines (especially lips)
Cracked stocks

ATC COMMANDOS

(Continued from Page 10)

Jap planes eame over to strafe. Seventeen were shot down. The men moved their cots inside the revetment.

These pioneer ATC men on Okinawa were the key personnel of what would grow into a very large organization. They were along because Colonel Luker wanted them to have the background and experience of a new type of operation. Yet they worked like laborers, servieed airplanes, made repairs with hardly more than ingenuity for a best tool.

A tent was spread over an adjacent gully to make a supply warehouse and office. A major, an engineer in civilian life, became unofficial "Director of Sandbag Operations," filling sandbags with the rest and making certain they were piled into proper shock resisting walls. They built an outdoor mess, shower and latrines. They had their first bath three days after they arrived; they did their own laundry in any handy bucket.

They even managed to share what they had with others. The Navy was still using flare pots to light the runway for the night fighters. ATC gave them a set of strip lights brought in by the first plane. And others shared with them. They promoted rations from the Army, lubrieating oils from the Navy. They learned the gentle art of making midnight requisitions.

Despite lack of equipment, the most rudimentary personal comforts and sleep, in spite of air raids and artillery shelling, regardless of mud and dust and insatiably hungry insects, these ATC men had a fully organized air transport business going within a week. The planes came in on schedule bringing mail, replacements, medical supplies, plasma, whole blood and even much needed bomb fuses. And they depart on schedule, carrying mail and urgent freight and, most important, the wounded.

The men began to talk among themselves of a possible ATC task force unit, a small organization charged with the job of setting up ATC stations in newly occupied enemy territory. This unit, they said, should do all the dirty work, then be relieved by a permanent airbase unit and sent on with the next task force to establish the next new station. And who, they will ask you belligerently, is more qualified than they for such an assignment. They have learned much and they don't want to waste it.

Remember the old wheeze—ATC stands for Allergic to Combat. You won't think so when some dark night you crouch behind a sandbag hiding from Jap bombs and you hear the cheerful voice of an ATC man sing out, "You should have been here when it was really rough." ☆

PICTURE CREDITS

FRONT COVER: M/Sgt. R. H. Haley. 8-10: Maj. Milton R. Krims. 15, 16: Signal Corps. 22, 44, 45, 46: T/Sgt. Roger Coster, AIR FORCE Staff Photographer. 27 (top): Lt. O. C. Sweet, 3rd Air Force. 47: Corporal Kammerman. 60: T/Sgt. D. H. Brockell.

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B-29 FLIGHT ENGINEER

(Continued from Page 27)

a maintenance man. He is more like an engineer on a ship. He must be able to make emergency repairs during flight; he has to know all about the different systems in an airplane—the wiring system, the fuel system, the emergency landing gear system, and the electrical system.

"Sometimes these problems can be pretty complicated. One B-29 had its control cable shot out over Tokyo. The flight engineer climbed into the back and repaired the cables while they were still over the target."

Sgt. Hayden F. Washington, a typical B-29 flight engineer, was eliminated as a flight cadet for physical reasons. He was reclassified as a gunner-mechanic, and at a Technical Training Command School at Amarillo, Texas, received a general four-engine mechanic's course. This was followed by a 10 weeks' course in electricity at Chanute Field, Ill., where he learned just about everything there was to know about the electrical system of heavy bombers. What had been rumors about a B-29 assignment became an actuality when Washington was sent to the Boeing Aircraft School at Seattle for a special 10-weeks Superfort course. He did sheet metal work, assembled engines, worked on hydraulic, oxygen and electrical systems. He began to know the B-29 from bauxite up. The toughest weeks of the training program, however, were spent at the flight engineer's school at Lowry Field, Colo. As a flight engineer, Washington was no longer concerned with simple airplane maintenance. He was learning how to make flight plans, about lift-over-drag ratios, prop and engine efficiency. He was learning a lot of things you had to work out on paper before you could try them in the air. Most important of all, perhaps, was that Washington had moved up into the realm of cruise control. He learned that cruise control is a method of carving the bomb load out of the fuel reserve.

Captain Norton explained why flight engineers receive sueh tough schooling. "A flight engineer's responsibility is a heavy one. He's got to make quick decisions, and to make them right he's got to have a good aeronautical engineering background. He must be able to estimate accurately the effects on fuel eonsumption and airplane performanee caused by change in gross weight, altitude and loading conditions. He must check loading, and transfer of fuel as the load decreases. He's got to be able to figure gallons of fuel per hour. He's got to know when to change airspeed to compensate for changing weight and to maintain maximum economical operation."

The man for the job

The flight engineer also carries an abbreviated tool kit for making minor repairs to any reparable part of the airplane. And, finally, there are the tools that are permanent installations on the flight stand—the levers, the switches and the instruments. He must never relax from watching these during the 16 or more hours of the mission.

For his cruise-control job, the flight engineer's tools are the slide rule, the cruise control chart, the climb chart, and the fuel-flow chart. With them he can best calculate altitude, airspeeds and power settings for maximum range. With these tools he must so closely estimate fuel consumption that there will not be more than a 100-gallon error on a 3,000-mile flight.

While it is true that the wing makes out flight plans on the basis of averages and cruise control charts, it is the flight engineer who eventually will determine the exact cruise control because he knows the characteristics of his airplane. The data he compiles are sent up through squadron to wing to command and eventually determine how many bombs will be dropped by a certain number of airplanes on a given target.

The flight engineer is not to be confused with the aerial engineer. The latter is a member of the combat crew of some airplanes other than the B-29; he is a gunner in addition to the duties of offering advice to the pilot on mechanical features of the airplane, of observing the functioning of the airplane in the air, and of reporting mechanical difficulties to the ground crew. The flight engineer, on the other hand, is actually in control of the mechanical functions of the airplane and is an important member of the flight control team.

Flight engineer training consists of 10 weeks at preflight school, 19 weeks of B-29 maintenance and inspection, and 10 weeks at flight engineer's school. Upon graduation from the flight engineer's school, students are now appointed flight officers or commissioned as second lieutenants and receive aeronautical ratings of aircraft observer (flight engineer).

B-29 flight engineer training is open to enlisted personnel assigned to duty with the AAF who can meet the requirements—physical, mental, age, training and others—outlined in AAF Letter 50-113 dated 24 April 1945.—Maj. Milton R. Krims, AIR FORCE Overseas Staff. ☆

The Intercom

As a medium for the exchange of ideas, AIR FORCE presents these answers to its Question of the Month. Replies are those of personnel recently returned from combat duty in the areas indicated.

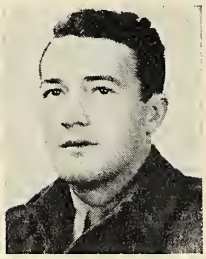
QUESTION: Of the entertainment you saw while you were overseas, what impressed you most?

Lt. Anthony Veteran, navigator, Italy: "The movies. We had movies everyday in the town of Foggia and twice a week at our base. Without them, I think we would have gone crazy. The thing I liked was that we got the latest movies and none of the extra trimmings which are usually so dull—no travelogues, no unfunny short subjects, just the feature pictures. When we weren't flying, I would often go to the movies twice a day. There were three movie houses in Foggia and I was a regular customer for all of them."

Sgt. Ralph Caporale, statistical control, Italy: "The Ella Logan show. She spent most of her time talking to us about home, telling us that everybody back home was waiting for us, and that we hadn't been forgotten. It was really marvelous. Then she asked the men to request any song they wanted and she sang it for us. We had a great many USO shows, but nothing ever rivaled Ella Logan. She went up and down Italy putting on shows—every place I went the men were talking about how wonderful she was."

1st Sgt. James L. Howell, administration specialist, India: "The dances. The Army and the Anglo-Indians gave dances regularly at Asansol in Bengal Province. An Anglo-Indian band provided the music —they knew American jazz before we came, but the girls could only do the waltz and the one-step. We soon taught them how to jitterbug and they loved it. A lot of people invited us to their houses to teach them how to jitterbug. We sometimes had three dances a week. That entertainment certainly served to break the monotony."

T/Sgt. William Killeen, observer, Southwest Pacific: "The Bob Hope show, with Frances Langford, Patty Thomas, and Jerry Colonna. I saw them on Owi island, in the Dutch East Indies, but I thought I was back on Broadway. They performed right on the line, and Bob Hope christened one of our airplanes. It was the most unusual show I ever saw—there we were, thousands of miles from home, yet only forty-five minutes from Broadway. We talked about it for weeks before they arrived, and for months after they left."



T/Sgt. J. A. Joseph, chief clerk, India: "The Jack Benny-Larry Adler show with Anna Lee. There were more than a thousand men watching that show, and everyone of us went wild. For two and a half hours we forgot there was a war. We saw the performance near Cairo, in an open air theater that we had built ourselves. Anna Lee ate in the GI mess and that certainly won our hearts. The whole thing was perfect. Later, I went to the IB theater and saw a few shows but none of them could match the Benny-Adler performance."

Lt. Paul Slawter, navigator, England: "I never saw much in the line of entertainment. Sometimes I wished that I were in the Southwest Pacific so that I could have seen Bob Hope and the rest of those entertainers. I suppose they had a great many shows in England, but they never got around to the camp where I was stationed. Our base was near Ipswich, which wasn't so far off the beaten path, but I had to go into London for entertainment. Maybe it was because I was there for only nine months, but I never saw any shows."

THIS ~~IS~~ WAS YOUR ENEMY

(Continued from Page 16)

Germany lost the Battle of Britain because of England's emergency fighter production, use of new detection devices and fighter control, the swift adaptation to night fighting. Germany needed more bombers, pilots, and time. By 1941, the GAF was divided among fronts, and England's bomber production was well begun. A phase of German aerial accomplishment which has received little emphasis—except by the aircrews who witnessed it—was the interception that met the first attacks on the continent. Together with the later "Defense of the Reich" in 1943 and 1944, it deserves more consideration than many of the Luftwaffe's more dramatic attainments.

With apparent sincerity, Luftwaffe strategists declared themselves "surprised" by the appearance of the AAF in Europe. Surprise was succeeded by a more unpleasant conviction. The Luftwaffe thenceforth must be purely defensive. After the arrival of the AAF in May, 1942, it became a fixed idea with the Luftwaffe to "convert to fighters." The conversion started too late. Yet it might have worked had it not been for the systematic destruction of the German aircraft production complexes, which reached its climax in February, 1944. Saving much of their production by dispersal of plants, the Luftwaffe might even then have had a chance had not the destruction of oil reserves, transportation, and airfields delayed every phase of German air warfare—most notably the new jet propulsion program and transition training. It was with such prospects that the Luftwaffe turned its hope toward scientific miracles, "secret weapons."

Luftwaffe Brain Trust

This German expectation of miracles was not entirely without reason. Nor were the "secret weapons" entirely a myth. Technical Intelligence still has a story to tell concerning the Luftwaffe's major and minor instruments of air warfare—in electronics, jet propulsion, and new explosive principles. Some of these instruments were the result of distinguished and systematic aeronautical research; others, like the pickaback plane, were ingenious attempts to save the Luftwaffe from earlier strategic or logistical errors. The Nazis may have been oratorical and mystical; German science never was.

At Adlershof near Berlin the Luftwaffe's fortunes were carefully watched, and assisted, by the Deutsche Versuchs-Anstalt fur Luftfahrt. In this aviation research center were focused new theories and experiments concerning planes, engines, instruments, guns. From the beginning, the special genius of this research was immediate translation of ideas into action. Long before the Allies had a realistic proving ground, the Luftwaffe's research men saw their ideas tested by the Kondor Legion in Spain.

These are the Questions

After General Pelz had thrown the Luftwaffe into its last desperate attempt to avert

defeat at the end of 1944, there was time for inquiry into the causes of the Luftwaffe's downfall. The question was split a dozen ways.

Did Milch seal the fate of the GAF with his widely quoted theory that maintenance and supply of parts were unimportant, because the Luftwaffe could rely on such fabulous production rates that every plane disabled would be replaced by one just off the production line?

Was nearsighted reliance on the Stuka an error? Could an immensely bigger production of heavy bombers have weighted the odds in the Battle of Britain sufficiently to assure victory then?

Failing in the heavy bombardment program, should the aircraft industry and the training program have been converted to fighters much earlier?

How real was the dearth of pilots? Was that problem primarily a difficulty in training?

Was the long attack on the German aircraft industry the main reason the Defense of the Reich failed?

If dispersal of aircraft production was a relatively successful defense against strategic bombardment, would the destruction of related systems of fuel production, transportation, and operational airfields have brought the end so quickly?

Can the answer to all inquiries concerning this defeat be put into the statement of a GAF commander, who declared "Germany lost the war because of the failure of the Luftwaffe, and the Luftwaffe failed because of bad planning"?

These are questions for the strategists and historians. They will be asked, with variations, wherever airpower is hereafter the subject of discussion. A simple fact that stands apart from the first terrifying myth of the Luftwaffe's power and apart from its dejected surrender is that Germany had an air force that in many respects reached greatness. That fact increases the greatness of the victory over it.

—By Capt. Harry H. Ransom
AIR FORCE Staff ☆

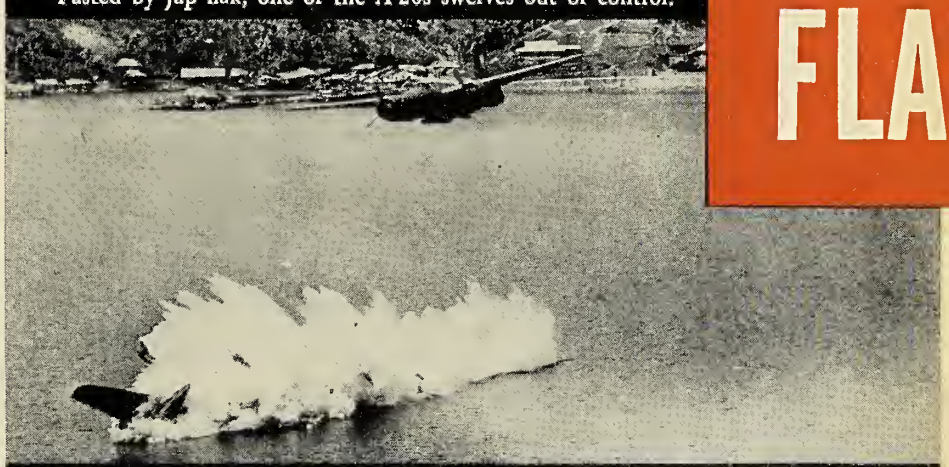
Answers to Quiz on Page 56

1. (B) Cameras
2. (D) P-39
3. (D) Unsatisfactory report
4. (C) Mr. Robert A. Lovett
5. (C) 700,000
6. (C) Nagoya
7. (A) True
8. (A) Continuously pointed fire
9. (A) True
10. (C) $300
11. (D) Corregidor
12. (D) Single-engine fighter
13. (D) P-63s
14. (C) 1,000
15. (A) Dolomite and sea water
16. (C) Same size
17. (A) Stout Field
18. (C) 70 to 80
19. (A) West coast of Africa.
20. Jap bomber Kate

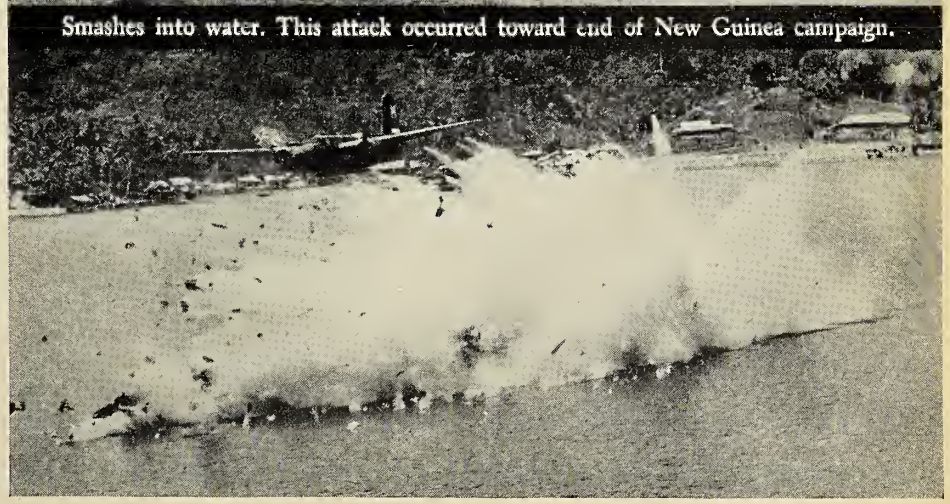
Low-flying A-20 Havocs attack Jap installations at Kokas, Dutch New Guinea.

JAP FLAK

Pasted by Jap flak, one of the A-20s swerves out of control.



Smashes into water. This attack occurred toward end of New Guinea campaign.



SHOOTING THE BREEZE

GOT ANY GOOD STORIES? SEND 'EM IN!

En Route. The airborne poker game had lasted from Paris to within a hundred miles of New York and the pot had been built up to breathless proportions. The fortune had passed from hand to hand in that remorseless and unequal distribution so native to poker. The field had narrowed down to Captain White and a Colonel Brown. The

big transport plane was nearing home soil when the captain finally called and announced, "Two pair—aces over kings!" The colonel tossed his cards on the table, said "three little fours," and hauled in the pot. In utter dejection the captain reached across the table, picked up the colonel's cards and examined them closely, one by one. Then he placed them back on the table. "Your word is sufficient, sir," he said.

USA. A young private in the AAF Convalescent Hospital at Coral Gables, Fla., returned from overseas with a leg injury, was being interviewed by a member of the medical staff.

"Let's see," began the doctor, glancing at his records, "you are 25 years old."

"Nope, I'm 18," the boy corrected.

"But you are Private Kelly aren't you?" the doctor asked.

"No, I'm not Kelly," the boy said.

"Then, I have the wrong records," the doctor said, somewhat irritated.

"No. Those are my records," the kid insisted.

The doctor looked at the boy a moment, then shook his head.

"It's like this, doctor," the boy began. "I enlisted when I was 15, but told them I was 21. I gave my name and address as Bill Kelly of Atlanta, but actually—I'm William F. True of Washington, D. C."

An investigation was ordered. It revealed that what True had said was true.

Pacific. Somewhere out in the broad Pacific a U. S. Navy destroyer plowed through the rolling waters. Aboard all was orderly and quiet. Then suddenly the sirens screamed, bells clanged, the loud-speaker system blared—"battle stations . . . air raid . . . approaching planes."

At a forward gun two sailors from Indiana adjusted their flak vests and helmets, checked their ack-ack gun and got set for the attack. Far to the east they spotted the oncoming planes which turned out to be a formation of big, silvery Superfortresses which gleamed in the sunlight.

The Navy boys had never before seen a B-29, but one of them commented with certainty and pride:

"Hell yes, they're ours. Nobody else could build anything that big and purty—and make it work."

Australia. A squadron clerk with a supply outfit in this land down under was outstanding in many ways. But most of all it was his clothes. He was a tropical worsted kid, shoulder straps, pleats and handmade patches and chevrons. Not GI, but nice. He married a pretty Australian girl who, in time, went to the States to live with the guy's parents until he would return. They were deeply in love, naturally, but the girl made him promise that he would tone down his wardrobe while they were apart. In other words, just hold everything until they could be together again.

The lonesome soldier was a model of deportment for a couple of months, then one evening he decided no harm could befall him if he got out just one night and tossed his feet around. He put on his sharpest uniform and set out to find some soft lights and sweet music. As he strolled along he thrust a hand deep into a trousers pocket.

Discovering a piece of paper, neatly folded, he drew it out. There, in his wife's handwriting were these words:

"Oh, so you're all dressed up tonight! Why?"

Brooklyn. An air of pleasant expectancy hung over the little bar on Nostrand Avenue. It was Mc-day. McArdle was coming home. A big sign saying "Good Work Johnnie" hung over the bar. A tavern artist had decorated it with gunner's wings and exploding ME109s. One guy said McArdle has 87 missions and another said, hell no, it was 100. A friend read off Johnnie's list of decorations and added, knowingly, "Good Conduct ribbon! That musta come the hard way!"

They wondered if McArdle had changed much and then they fell to discussing how he would come home from the separation center: train to Pennsy station, and then the subway. By comparing telegrams and train schedules they figured it would be another hour—then suddenly McArdle flung open the front door and stood there with a grin on his face and nine kinds of spam on his chest.

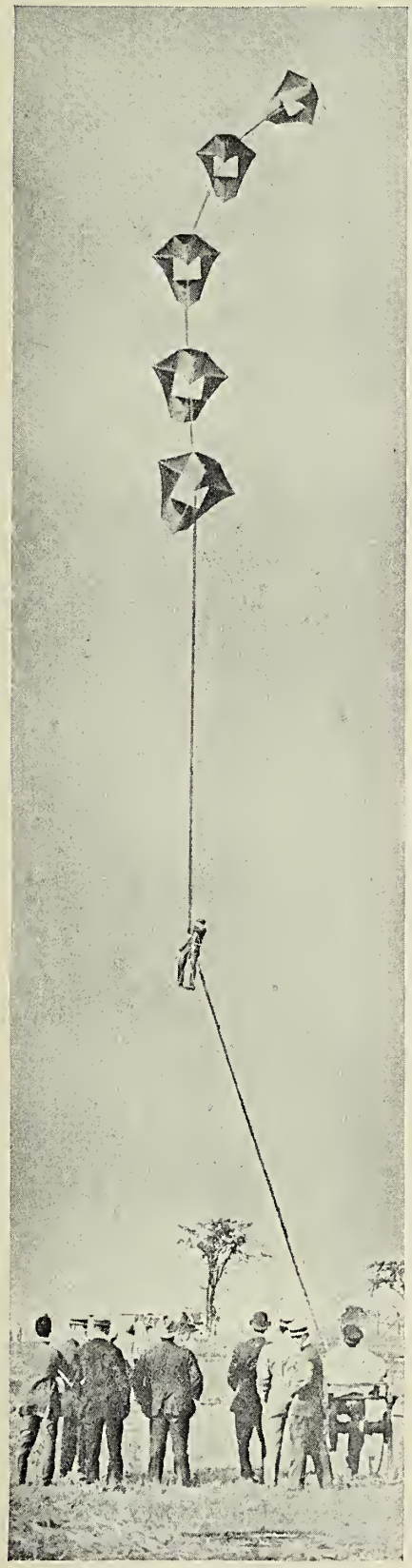
"Hello, Johnnie!" a dozen voices yelled. They leaped toward him. Tried to shake the hands which had pulled the triggers over Merseberg, Magdeburg, St. Nazaire, Hamburg and Kiel.

But McArdle called for quiet.

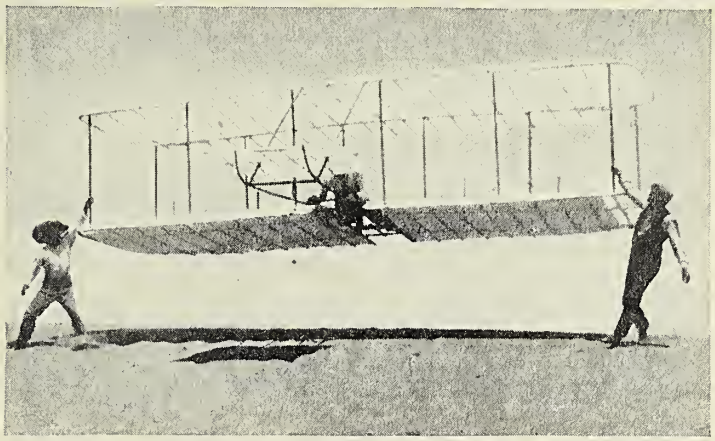
"Friends," he said, "I was so anxious to get home I didn't wait for the train. There's a taxi waiting outside. If you're glad to see me—pay the cabbie 26 dollars!"

Hawaii. "A man whose civilian profession was taking out teeth for a fee, in a recent rifle drill session, unwittingly practiced on me. No discipline governed this chappie, no rule, regulation or law—for shifting his piece with a snap, he dislocated my jaw.

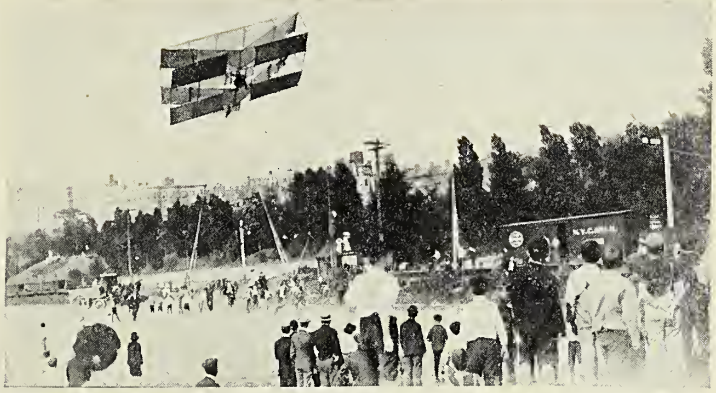
"His face-lifting use of the rifle, someday I may no longer rue, and since he's a dentist, why trifle—because of a molar or two? But this is my meek-minded protest, I claim a just anger engendered—the cad has submitted an invoice, for professional services rendered!" ☆



Five Perkins kites (class of 1910) over Harvard Aviation Field hold up young blade who thirsted for higher learning.



1901. A couple of end men are ready to shove their buddy off Kill Devil Hill, Kitty Hawk, in the first Wright glider that had controls.



Charles Hamilton is towed along the N. Y. Central track in weird contraption devised by Israel Ludlow. The truant officer had a busy day.

Father of the pogo stick, Matthew B. Sellers demonstrates a little hedge-hopping in a five-step glider that was quite the thing in 1908.

TAKE CARE OF YOUR .45—so it can take care of YOU!
Don't wait until you need your small arms to check them. Whether you're armed with a .45, a carbine, a rifle or a sub-machine gun, know your equipment — and know that it will fire when you need it!
Read: JOHNNY GET YOUR GUN—IN SHAPE, Page 60

AIR FORCE

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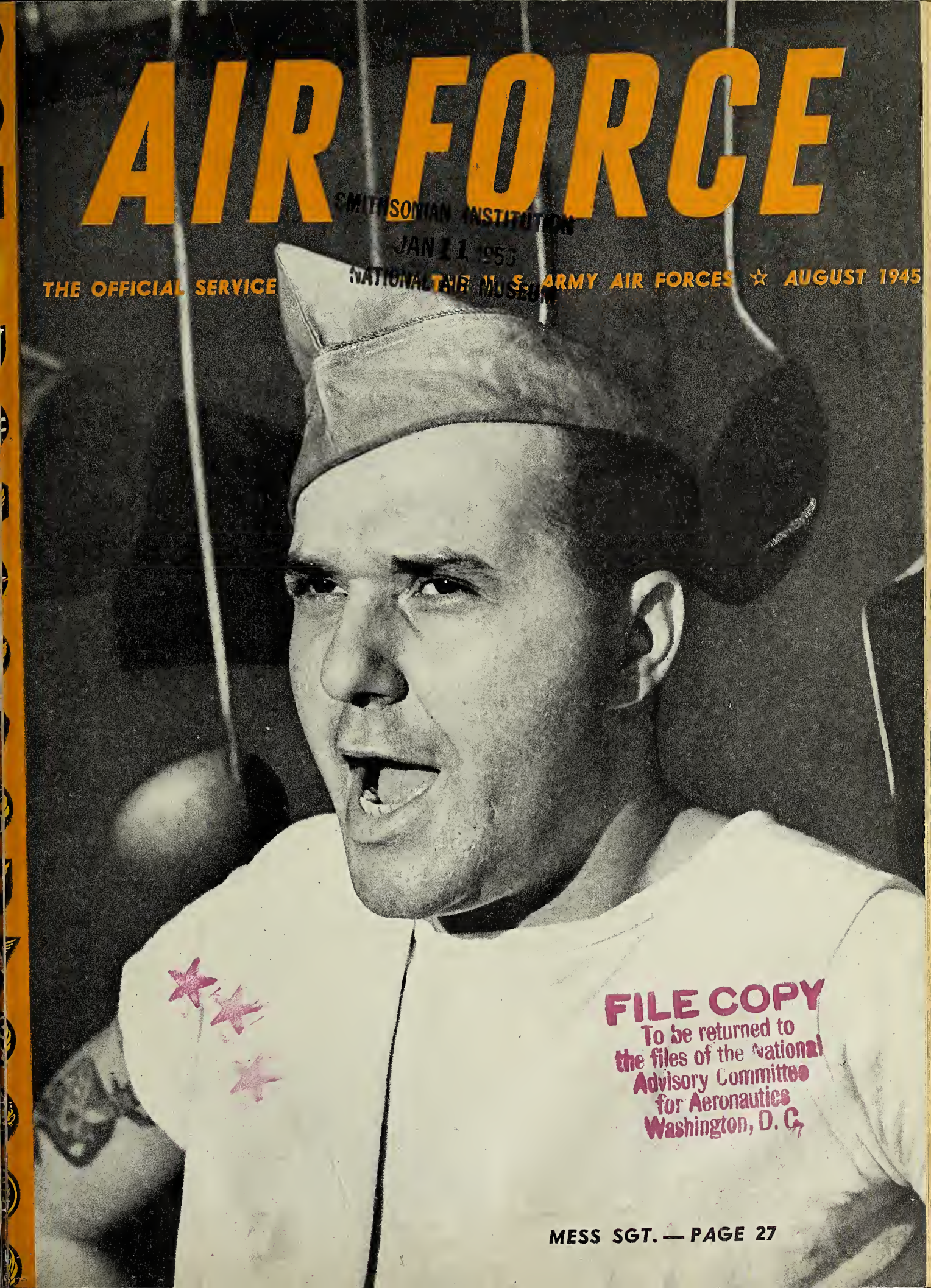
NATIONAL AIR MUSEUM

THE OFFICIAL SERVICE OF THE U. S. ARMY AIR FORCES ☆ AUGUST 1945



FILE COPY
To be returned to
the files of the National
Advisory Committee
for Aeronautics
Washington, D. C.

MESS SGT. — PAGE 27

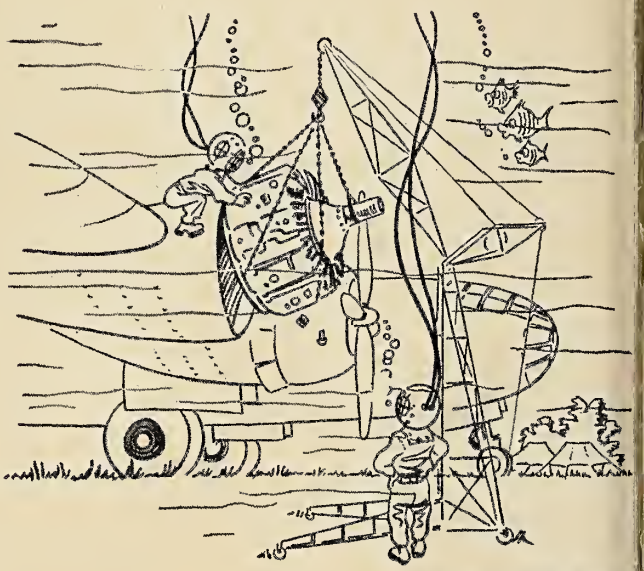
India-Burma Items

BY CAPT. WM. T. LENT
AIR FORCE Staff

"It's been like this ever since he sent for that USAFI veterinarian course,"

"And I recall how I'd chew out poor old Hung Low back home when there was a button missing."

". . . Which reminds me; I got a letter from my mother-in-law today."



"I guess the old man's serious about maintenance during the monsoon."

AUG 9 1945

Rendezvous

On Service Awards

Dear Editor:

Many thanks for your May issue of AIR FORCE which I found up to your usual high standards.

The article "For Service" was especially interesting and apropos in view of the current Adjusted Service Rating system announced by the War Department recently. There is a question about the bronze star for the Air Offensive, Europe which is to be affixed to the European-African-Middle Eastern Theater ribbon and I would greatly appreciate your advices on the qualifications for this star which would clarify the situation considerably. Was service as a combat member necessary for this award or would being a member of the ground crew of a fighter squadron, as it was in my particular case, during the time limitations qualify one for this award?

Lt. Harold A. Seestadt,
Strother Field, Kan.

Dear Editor:

In the May issue of AIR FORCE appeared an article, "For Service." This article listed the areas for three New Guinea campaigns. Could you kindly inform me as to the regulations covering these three campaigns?

S/Sgt. Chester J. Sundstrom,
Stuttgart, Ark.

To readers Seestadt, Sundstrom and many others who have written to us on this subject, we suggest that you see War Department General Orders 33 and 40, of 1945, and AAF Letter 35-240, 23 May 1945. The general orders list all campaigns to date for which participants are entitled to wear battle stars. The subject of the AAF letter is "Provisions for Establishing Combat Credit in Disputed Cases," and was written to help Decorations and Awards officers in determining proper combat credits. This AAF letter also contains a complete list of references on regulations, general orders, circulars and letters which govern the eligibility, authorization and wearing of decorations and awards.—Ed.

Etiquette

Dear Editor:

After much fruitless debate we are still undecided as to which of the following interphone expressions is correct and is now being taught, i.e., "Waist gunner to pilot," or, "Pilot from waist gunner." Could you enlighten us?

Sgt. Emanuel Morris,
Langley Field, Va.

Both are wrong. The correct way is "Pilot, this is Waist Gunner, over." After communication is established, the word pilot need not be repeated with each message. The waist gunner merely says, "This is Waist Gunner," and then goes ahead with his message. See AAF Letter 50-93 dated 6 February 1945.—Ed.

Wrong Instinct

Dear Editor:

Quoting from the article "When In

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AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

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Rendezvous

(Continued from Page 1)

Trouble—Sound Off" as printed on Page 57 of the May issue of AIR FORCE. "No. 157 was a B-24 . . . practicing emergency procedure . . . with No. 3 engine feathered, the No. 4 engine sputtered and quit. The plane swerved suddenly and violently to the right. The pilot instinctively gave her right rudder . . ."

Either the lad who wrote the article has a misconception of what happens when a B-24 loses two engines on the same side, on the right in this case, or the pilot was trying to snap-roll the plane, a maneuver not recommended in this type aircraft.

In the event of engine failure in flying the B-24 it will be necessary, in order to hold the airplane level on a certain heading, to apply—and hold—opposite rudder. With No. 3 engine feathered, as was the case with No. 157, the pull was to the right, thereby making it necessary to *hold left rudder*. No. 4 goes out—now we have two engines out on the same side. There will be an additional pull to the right, to compensate for this condition, it will probably take every bit of opposite rudder the pilot and copilot can hold, assuming they have an airspeed of 150 mph or greater for a normal load condition.

Lt. Kenneth F. Gallagher,
Lt. Harlan T. Jensen,
Lt. Patrick R. Desmond,
Lt. Richard F. Bohannon,
Capt. Francis T. Hegarty,
Capt. Alex G. Kalinsky,
Courtland AAB,
Courtland, Ala.

Dear Editor:

Regarding your article on Page 57 of the May issue. Pity the crew who must fly with the B-24 pilot who "instinctively gave her right rudder" when the engines 3 and 4 quit. Little wonder "the ship got out of hand," lost 10,500 feet and made a forced-landing. Being stationed at Tonopah, Nev., would be punishment enough.

Lt. Jack W. Chandler,
Langley Field, Va.

Our new B-24 authority agrees. He says that the correct instinct would be to give the plane LEFT rudder. If the pilot had followed any such instinct as mentioned in the story, he points out, the B-24 would have been flying upside down, but quick.—Ed.

New Member

Dear Editor:

Herewith I shall initiate myself into your magazine's large group of correspondents who devote themselves solely to finding errors in your interesting stories and pictures, and with this letter submit the first communication I have ever forwarded to any type of publication, military or civilian.

The error I am referring to is in the June 1945 issue, in which the caption of the second picture from the bottom on

How Sharp are YOU?

Can you look at this photo for 60 seconds and remember what you have seen? A trio of mechs is shown hard at work at an airbase in Italy. From left to right are Pvt. Marshall Hufstetley, Pfc. Delbert McCullough and Sgt. Harry L. Jones. After you've finished, turn to Page 43 where you'll find a batch of 10 questions. Count 10 for each one you get right. If you score 70 you're average; 80, you're on the ball; 90, very sharp, and 100 means you've got a super-eagle eye.

HOW SHARP ARE YOU? . . . . . Turn to Page 43

Page 22 states, "This C-47 fuselage with thatched roof served well as base operations." I think if your identification expert will examine the picture more closely, he will find that it is a C-46 fuselage and *not* a C-47 fuselage. If the misnomer is due only to a typographical error, I shall bow quietly out of the "picture."

Pfc. David M. Sweeney,
Berry Field, Nashville, Tenn.

C-46 it should have been, thus making Pfc. Sweeney a full-fledged member of a large, but we trust not growing fraternity.—Ed.

Unit Citations

Dear Editor:

In reference to the Artiele "Battle Honors" appearing in the March, 1945, issue of your magazine (a magazine that is awaited eagerly every month by all AAF patients at this hospital), we have had many visits to our office. These patients state that they were with a particular unit at the time their unit was cited and request we secure for them the citation or quote the authority authorizing the award of same.

If it is practicable and does not conflict with regulations, we suggest that when you print in future publications of AIR FORCE a chronology of AAF Units which have been awarded the citation, you also include the General Order and date.

AIR FORCE, by the way, is deemed not only by Air Force personnel but various Ground and Service Force Units as well, as being by far the best serviceman's publication to come out of this war.

1st Lt. Robert E. Wallin,
AAF Hospital Liaison Officer
Bushnell General Hospital

Publication of the GO authorizing each Unit Citation began with the June issue.—Ed.

Whoa, There!

Dear Editor:

In the "Cross Country" section of AIR FORCE for May 1945, there is an article on safety reminders for P-47 trainees at Bradley Field, Conn.

One of the reminders in your article is "7-8000 rpm while taxiing." Although we had some exceptionally good P-47s here none of them would turn up 7-8000 rpm while taxiing, flying, or in any attitude.

Sgt. Alex Seed,
Bradley Field, Conn.

Dear Editor:

Come now, 7-8000 rpm is a bit too fast for taxiing, isn't it?

We certainly enjoy your magazine. Keep up the swell work.

Sgt. Ellis Winikoff,
Sebring, Fla.

Dear Editor:

". . . 7-8000 rpm While Taxiing"

I don't know much about the P-47, but the 40s and 51s I've flown get off the ground with a maximum of 3000 rpm.

The boys must be in quite a hurry to get back to the line!

F/O James F. Rice,
Bartow Field, Fla.

We don't know how that extra zero snuk in, it should have been 7-800 rpm.—Ed. ☆

In This Issue

Meet our cover subject, M/Sgt., Jessie W. Byrd, of Roanoke, Va., who has mastered many a mess from Port Moresby, New Guinea to Macdill Field, Fla. (See "Master of the Mess," Page 27). A veteran of 33 months overseas, Sergeant Byrd left his Bangor, Me., beer garden to enlist in the Army in January, 1937. After serving as an antiaircraft observer in Hawaii prior to the war, he shipped overseas again in January, 1942, this time as a mess sergeant. At Port Moresby, where he served for a year and a half, he set up a huge AAF consolidated mess capable of handling 5,000 men a meal. At that time he flew to Sydney, Australia, twice a week in a B-17 to bring back supplies. On one trip a crash landing resulted in the destruction of approximately 2,800 eggs. Fond of flying, he spent his spare time going on combat missions until one day a flight of Zeros all but shot apart the bomber in which he was along "for the ride." Thereafter he devoted himself to more peaceful pursuits, such as turkey hunting and discovering a gold mine. After other New Guinea assignments, the sergeant returned to the states in September 1945. At present he is in charge of the combat officers' mess at Macdill Field. . . . The cover picture was taken by 2nd Lt. Oscar C. Sweet, a photographic officer with the 3rd Air Force, who writes of his Army life . . . "pretty dull; no crash landings, have never bailed out, and have never been run over by a half-track." . . . Lieutenant Sweet is responsible for other AIR FORCE photographs, including the July WAC Cross Country cover.

☆

After all the hurrahing for the way Allied airpower performed in the drive across Europe, we thought a down-to-earth appraisal from one of the top U. S. ground commanders would be appropriate. So we invited Lt. Gen. William H. Simpson, commanding general of the U. S. Ninth Army, to prepare an article for us on airpower as it looked from the ground. He agreed, and the result is "Partners in Battle," which appears on Page 4 of this issue. General Simpson was our choice for several reasons. First, his Ninth Army was colorful and highly effective. Second, General Simpson is an infantryman through and through, just the kind we thought should do this appraisal of air performance. He is frequently called the "doughboy general." Third, he has a reputation for saying just what he thinks, no more and no less. Fourth, he is also a student, a "book soldier" who knows military theory as well as military practice. . . . General Simpson is a Texan, bald, tall, lean and hard. He is quiet and determined, all in all just the sort of soldier you like to think of in top U. S. commands. He is 57 years old.

☆

Thirty-eight years of progress in Army aviation began with the memorandum reproduced on this month's back cover. To mark that anniversary, August 1 was observed throughout the country as Air Force Day with appropriate ceremonies not interfering with the main business of carrying on the war. Most AAF installations held "open house," and there was much reminiscing and prognosticating at nearly 1,000 special gatherings of airpower enthusiasts. As the 39th year in Army aviation began, millions of AAF men and women could look backward with pride to the progress of our organization—to its days as a branch of the Signal Corps, then as the Air Service, the Air Corps and, finally, as the U. S. Army Air Forces—and, they could look forward to the day when Japan's air force will be completely humbled in defeat, as was the Luftwaffe.

☆

Recently returned to the States from the chore of setting up our Far East Branch for the production of the Manila edition of AIR FORCE, are Majors John Jenks and Tom Hardman. While on the outskirts of the Filipino capital, they watched P-38s, their wing tanks plainly visible, heading eastward for what they thought were routine low-level bombing missions against the not-too-far-away Japs. It wasn't until sometime later they learned that the wing tanks had been fire bombs and that the mission had been what top commanders called an outstanding example of destruction by fire bombs at Ipo Dam (See "Blanket of Fire," Page 7). . . . Newly arrived in our Manila office from the Marianas where he has been covering B-29 activities is Maj. Milton R. Krims. He arrived minus one hat which was kept by the B-29 crew with which he had flown many missions. Since they couldn't keep the major, whom they considered lucky, the crew members did the next best thing and kept his hat. ☆

Our Major Krims and ATC's Okinawa billboard.

PARTNERS IN BATTLE

BY LT. GEN. WILLIAM H. SIMPSON
Commanding General, Ninth U. S. Army

Air battle north of bulge at Puffendorf: "Tactical airpower . . . gave material assistance in smashing through hard core of enemy resistance."

When General von Harpe, commander of the 5th Panzer Division, was captured by Ninth Army troops in the Ruhr pocket he confessed that superiority of our airpower not only reduced the morale and effectiveness of the German civilian population but was a decisive factor in all our victories. Dittmar, the German official army news commentator who surrendered to our XIX Corps late in April, agreed that overwhelming strength in the air gave the Allies a tremendous advantage in the Normandy landings and prevented the enemy from mounting an immediate and strong counter-attack.

Such admissions by enemy leaders are indeed eloquent testimonials to the achievements of our air forces in the great military campaign that so recently ended in complete victory for the armies of America and her partners on the battlefields of Europe.

I am certain, however, that by this time the proponents of airpower no longer need anyone to champion their cause; no one can say that air has failed to fulfill the major task assigned it in the grand strategy for Germany's defeat. By overpowering weight of bombs our air forces greatly lessened the enemy's economic capacity to wage war; and when our armies took the field, tactical airpower, skillfully applied, gave material assistance in smashing through the hard core of enemy resistance to ease the path of our advance.

Throughout the American ground campaign on the Continent it was my honor to command the Ninth U. S. Army. This army won many successes starting soon after it established its first command post in the field at St. Sauveur Lendelin, France, on August 30, 1944. Its initial mission was to reduce the fortress of Brest and to contain other German forces on the Brittany peninsula. On September 16 it accepted the surrender of 20,000 Germans at Beaugency and moved on to Belgium to take over the sector extending from St. Vith to Luxembourg. In mid-November, the Ninth Army began the Roer operation and succeeded in driving the enemy across the river. By the end of February, 1945, the Ninth Army was at the Rhine. One month later its troops stormed across and shortly afterward, in coordination with the First U. S. Army, completed the largest double-envelopment in military history—the encirclement of the Ruhr involving the entrapment and eventual reduction of more than 300,000 enemy troops. From the Rhine to the Elbe, the advance of the Ninth Army was speedy and culminated in juncture with our Russian Allies, who had been driving from the east.

The success of these operations has depended primarily on the enthusiasm and splendid courage of the troops and in no small measure on painstaking planning and preparation, coordination of all echelons, and rapid and complete exploitation of the tactical situation.

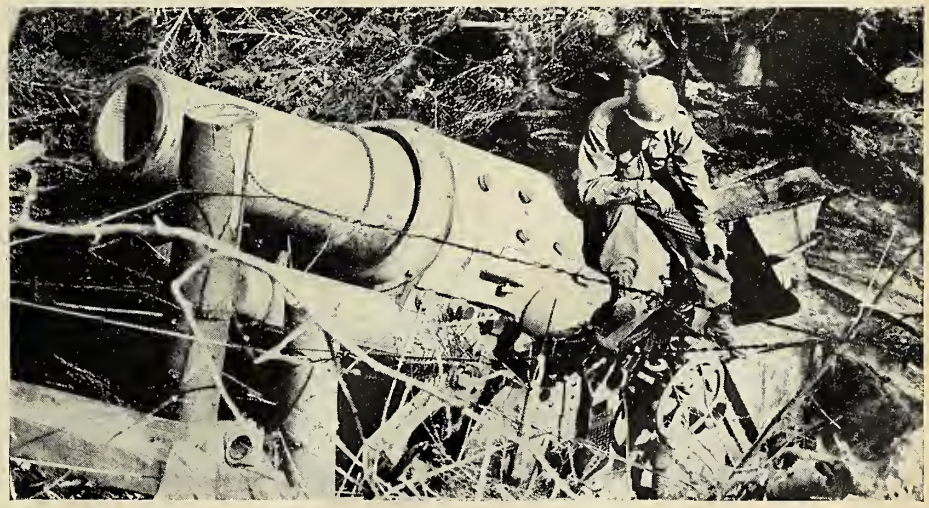
But much of the credit must go to the strategic and tactical air forces. It is difficult to imagine how these extensive ground operations could have been carried through with

A battle-wise ground force commander looks at airpower: here are some of his conclusions

Marauders cut last open rail line over Erft River at Euskirchen: "By overpowering weight of bombs our air forces greatly lessened the enemy's economic capacity to wage war."

Duren, Germany: "Stunning effect of saturation bombing, destruction of weapons and emplacements, disruption of communications—all go hand in hand with enemy's casualties."

Gen. Eisenhower confers with Gen. Simpson during preparation for Rhine crossing.



German gun knocked out by single bomb: "Generally excellent results have been achieved by air attacks against columns of vehicles, buildings, artillery emplacements."

such rapid success had the enemy hindered our activities through the use of his airpower as we have disrupted his ground operations by our air assault.

Having gained an air superiority so complete as hardly to have been hoped for in pre-invasion planning, it soon became apparent that the needs of the ground forces were being well served.

The enemy's offensive air actions against our installations dwindled in effectiveness and permitted an unexpected freedom of action on the part of all ground force troops in rear of forward elements. Service and supply installations were enabled to operate freely 24 hours a day. This was a condition without which the relatively short battle of France, the extremely rapid advances from the Roer to the Rhine, and again from the Rhine to the Elbe, could not have taken place.

During the Battle of the Bulge major troop movements were made on traffic-jammed highways in broad daylight without serious air interference. Control was maintained without our army being plagued by having important headquarters attacked by enemy air.

Demolished bridge over the Seine River: "No one can say that air has failed to fulfill the major task assigned it in the grand strategy for Germany's defeat."

On the tactical side, the Ninth Army received direct cooperation from the XXIX Tactical Air Command of the 9th Air Force. This efficient air organization, commanded by Brig. Gen. Richard E. Nugent, worked in closest harmony with our ground commanders throughout the campaign across France, Holland, Luxembourg, Belgium, and Germany. It was a partnership that paid profitable dividends. A good example was the Ninth Army's Rhine offensive.

The nature of the enemy's defenses east of the river was such that XXIX TAC was asked to try to isolate the battlefield prior to the actual crossing by our troops. Air strikes were made to the maximum extent possible on communications facilities leading into and within the anticipated battlefield. Very good results were achieved. On D-day and continually thereafter until the bridgehead was secured, 24 aircraft provided continuous daylight close cover for the bridgehead area, with 12 aircraft cooperating with each of the two assaulting divisions. In addition a varying force of from 16 to 32 aircraft flew top cover at 15,000 feet over the same general area.

The air cooperation was adequate and extremely effective. Attacks were made on the front of one infantry division against an armored build-up which was preparing for a counter-attack against the bridgehead. Claims were 29 enemy tanks destroyed and 29 others damaged.

As the bridgehead expanded, antiaircraft artillery assumed full responsibility for protecting the Rhine bridges. This released more aircraft from flying protective bridge cover and allowed their use for close cooperation. When the attack developed its full punch, each of the three army corps had one group flying close cooperation missions.

I do not wish to convey the impression that teamwork of air-ground warfare has reached perfection. There have been mistakes and in some instances a waste of effort. Test of battle has shown us the need for certain improvement both in tactics and equipment. Nevertheless, I share with my commanders the opinion that the overall performance of the tactical air command has been superior and in most instances the quantity of air assistance provided was sufficient to meet our requirements.

From the combat experience of the Ninth Army it is possible to summarize briefly some of the benefits accruing to ground forces that are provided with air assistance. At the same time, I would like to mention some of the shortcomings that have come to light during the course of nearly one year of battle experience.

Generally excellent results have been achieved by air attacks against such targets as columns of vehicles, buildings, artillery emplacements not fitted in concrete bunkers, troop concentrations and forward supply depots. Attacks against individual tanks and single assault guns have been variable. Excellent results were obtained when tanks were hit or when a near miss was scored with 500-pound bombs. Nevertheless, the inaccuracies of the fighter-bomber when employed against a small target have sometimes resulted in air effort being expended which is believed to be disproportionate to the results. Air attacks against pill boxes also have been comparatively ineffective because of the small size of the target.

Villages invariably have been easier to occupy when attacked by air in cooperation with a ground assault which followed immediately.

In regard to saturation bombing, it is believed the bombing itself produces only a small percentage of enemy casualties. If the production of enemy casualties were the only remuneration for saturation bombing, the effort would not be justified. The stunning effect of saturation bombing, the destruction of weapons and emplacements, the disruption of communications—all these go hand in hand with the actual personnel casualties the enemy suffers to weaken his strength and cause him to lose control. For that reason I feel that saturation bombing oftentimes will be of extreme value in the future when our ground forces are faced with the problem of penetrating a well-organized and strongly-defended enemy position.

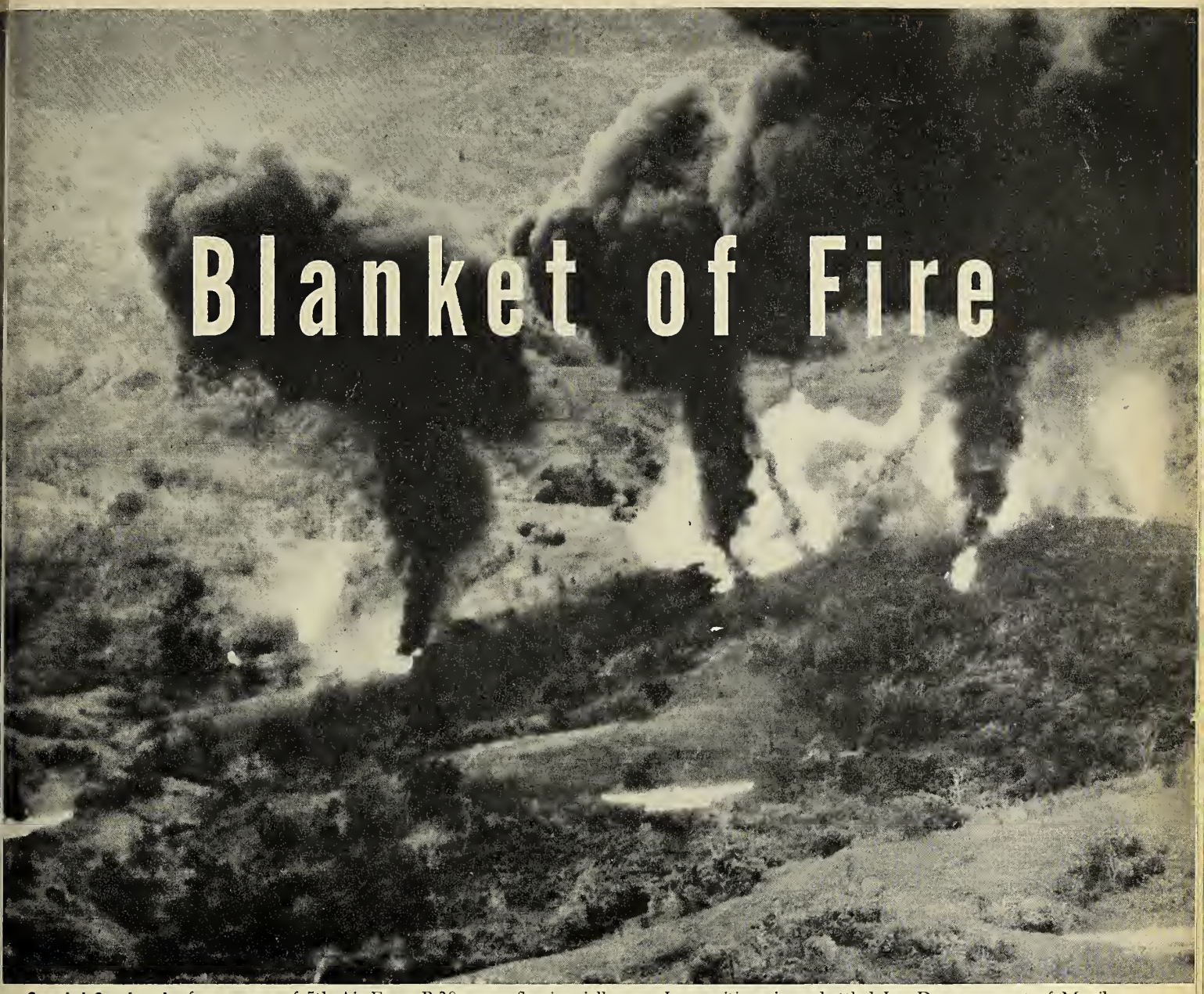
Our commanders also agree that morale was raised materially when our troops witnessed an Allied air attack, and it is almost universal opinion that the presence of Allied aircraft caused the enemy's artillery fire to slacken or cease altogether.

This brings up the question of whether ground units which are depending on air cooperation should make an attack in the event their promised air assistance fails to arrive.

Ninth Army experience indicates that no hard and fast rules should be laid down in this regard. In our advance from the Roer to the Rhine the ground plan was not so dependent on air cooperation. The air attacks in this phase of the campaign were designed primarily to disrupt the enemy's communications and we were prepared to attack

(Continued on Page 34)

Blanket of Fire



Special fire bombs from waves of 5th Air Force P-38s spray flaming jelly over Jap positions in embattled Ipo Dam area east of Manila.

Fighter-borne fire bombs proved themselves on Luzon as a potent new Jap-eradicating air weapon

BY COL. ROY R. BRISCHETTO
5th Fighter Command

This is the story of a bomb and how it grew into a weapon so potent that in its wake American ground forces have been able to walk into fanatically-held Jap positions "standing up" and "without opposition."

When we first tried hanging a special type of fire bomb on wings of 5th Air Force fighters we already knew we had a bomb that carried a new kind of wallop. Extensive experiments at the AAF Proving Ground, Eglin Field, Fla., had proven that. But it was only after a multitude of trials and errors that we began to realize the full extent of the knockout punch we were carrying on our bombracks.

These bombs were first used to their full effectiveness as ground coordination weapons during the battle for Leyte. Near the island coast north of Ormoc there was a native barrio from which the Japs were offering stubborn resistanee. When we received a call for air support we decided to try out fire bombs. Four fighters went over, each carrying a pair of the bombs which would scatter flaming jelly over the Jap positions.

This is the teletype message that came clattering in that evening from the division commander: "Results of today's air strike unbelievable: one half of one house remains in the town. Give us more of same."

That was fine. But we had not yet put our new bombs to the real test. This target had been ideal, wide open with easily inflammable native houses; we knew we still had a great deal to learn. At every opportunity we continued to

push our studies of effective tactics for getting the most out of the bombs.

With our fighter-borne fire bombs we splashed sheets of flame over Corregidor. The Yamashita line got its taste of fire bombs. Every strike taught us new tricks. But it wasn't until late in May when our ground forces took Ipo Dam and the Metropolitan Road, cracking the strongest bastion of the enemy's Shimbu line defenses northeast of Manila, that we felt we had reached the ultimate we had been seeking. At Ipo Dam, and a few days later at Balete Pass, we proved beyond doubt that the special fire bomb treatment administered by a fighter force large enough to saturate the target can cure even the most malignant case of Japanese resistance.

We pulled all the stops on the Ipo show. Instead of the usual squadron or group we massed from 200 to 250 P-38s, P-51s and P-47s representing the 475th, 8th, and 49th P-38 groups; 348th and 35th P-51 groups and the 59th P-47 group for the daily strikes.

These missions, set up by Brig. Gen. Frederick H. Smith, commanding general of the 5th Fighter Command, were worked out in final detail through close cooperation between the command's A-2 and A-3 and the ground forces' G-2 and G-3. It was decided that complete saturation of the enemy-held area was impractical and unnecessary; so targets were limited to the five strongest Jap positions, each averaging about one square mile. Three target areas were established, with one day's total bomb coverage to be concentrated on each. Closest coordination between ground and air parties was an absolute essential. From the ground a support air party maintained continuous radio contact with an air coordinator appointed for each mission. It was SAP's job to have the target marked with a ladder of artillery fired smoke on the air coordinator's request and to notify him of changes and emergencies.

Weather presented another problem. In the eight days prior to the completion of the Ipo strikes the weather station in the Ipo area reported a rainfall of 4.49 inches. We had to prove that even such a thorough soaking of the target area's dense foliage would not put the damper on our fire bomb treatment. To give us a continuous picture of the weather before and during the strikes, a P-61 was orbited over the target from 0545 hours each day, reporting every 15 minutes.

The call for aerial assistance in the area of Ipo Dam, chief reservoir for the Manila water system, came after repeated frontal attacks by American ground forces had been repulsed by entrenched enemy troops with heavy losses. The Japs were throwing out a withering fire from all caliber weapons including heavy mortars, 150 mm artillery and antiaircraft guns used as artillery. Among the wooded knolls, rolling hills and small valleys patched with thick vegetation the enemy had taken advantage of all natural defense barriers, augmenting them with fortified caves and interlocking systems of fire trenches.

On the first day of the scheduled strikes weather closed in over the target and we were forced to take a rain check. But on the following morning, May 16, we got the green light from our recco plane, and the show was on.

From that first day's report we learned plenty. Ground observers told us that the Japs who were not killed in the pattern of fire ran around like a cage full of squirrels. So on the following day something new was added. A-20s of the 312th Bomb Group followed the bomb-carrying fighters, showering the target area with parafrags and finishing off with a thorough strafing. With this strike we learned another lesson.

We learned to send the fighters over at low level in line abreast to make their runs downwind, with the first wave dropping at the far end of the target area and each succeeding wave dropping just short of the flight ahead. In this way we avoided obscuring the target with smoke for succeeding waves; we learned also to send the waves in rapidly at intervals of from 10 to 15 seconds. Another important safeguard we continued to employ was to route the withdrawing fighters over enemy territory to avoid danger to friendly troops from hung bombs.

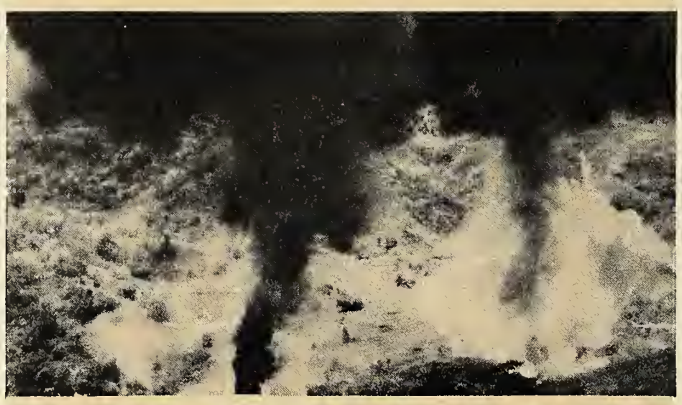
At the conclusion of the first three days' strikes the teletype brought us the news we had been awaiting. It was the support air party's summary of the action:

"Ipo area: Our troops closely followed strikes and overran all target areas with a bare minimum of friendly casualties. Conservatively estimate at least 650 Nips killed by air action with other casualties caused by Nips running from fire and burning areas and being caught by combined frag bombs, artillery and mortar fire.

"At least five large gas dumps of unestimated gallonage were destroyed. An estimated 60 to 80 vehicles, including

(Continued on Page 61)

Fire bombs burst with great sheets of flame in Ladd Field tests



In combat on Luzon, belly-tank bombs help break Jap resistance

These dead Japs on Tinian were easy victims of our fire specials

Hot java for a hot pilot. Pvt. J. Barbieri and Pfc. J. Springer, proprietors of Iwo Jima Inn, serve coffee to Maj. Chas. Sutton.

Mustang pilots Bill Fisher and Wes Brown leave their exclusive Iwo manse. In background are Jap plane wreckage and P-51 wing tanks.

LIFE on IWO

At base of Mt. Suribachi an overflow congregation stands in the rain, listening to services being conducted inside the tent which is Iwo Chapel for the time being.

Mechs of a Mobile Service Unit salvage parts of a wrecked P-51. Crater is filled with smashed Jap planes and debris of the Iwo battle.

Calling All Planes

BY S/SGT. WILL CHASAN
AACS, India-Burma

T/Sgt. Burke directs air traffic from control tower at Myitkyina where AACS got its first real lesson in Burma tactical operations.

It was late afternoon when the transport plane landed at an advanced Burma airfield, just five minutes by air from the nearest Japanese base. As soon as the plane braked to a halt, its cargo doors swung open, and unloading began.

A British control officer wanted to know who the men were. He was told that they formed a tactical team of the Army Airways Communications System. Their mission was to install a control tower, navigational aids, and communications facilities, and direct air traffic in and out of the field. Furthermore, he was informed, they would be on the air in less than two hours.

The officer observed that such a job usually took up to a week to complete. But when airfields are needed for air-ground cooperation, a week is much too long a time. And the AACS, which has been running airfields, airways, and radio aids all across Burma for the 10th Air Force, the Combat Cargo Task Force, and elements of the RAF, has reduced the job to a swift and certain routine.

That routine—and the subsequent establishment of communications and navigational aids—has contributed to the safety and success of thousands of flights, saved uncounted numbers of planes from cracking-up, and pushed more traffic through primitive strips than is handled at most Stateside airports. As Lt. Col. Jess R. Guthrie, CO of the group in Burma, said "The value of these tactical teams in the Burma campaign cannot be questioned. They have proved their worth under conditions not encountered in normal operations." And, the commanding general of the Combat Cargo Task Force in the I-B theater, added, "I want my organization to continue to be served by them."

The situation at Momauk, in northeastern Burma, provides a good example of how these tactical teams operate. A strip at Momauk had to be activated immediately to supply the Chinese troops who were besieging Ghamo, several miles to the southeast. On December 2, 1944, an AACS team at the tactical training center in northern Assam was alerted at 1300 hours. At 1530 hours, 10 men and 15,000 pounds of equipment were flown out of an Assam field. The party reached Momauk too late that night to get any work done. But their operations officer in Assam had been told that they would be on the air at 0900 hours the next morning.

At precisely that time—20 hours after the unit had been alerted in India—Sgt. Will Herman adjusted a tower microphone and said, "George Jig tower testing. Any plane or station reading George Jig tower give us a call."

There was an immediate reply "This is 8—reading you R 5, S 5. Give us landing instructions."

Momauk was in business. That day it landed 100 planes on its 2,600-foot strip without an accident.

The AACS got its first real lesson in Burma tactical operations at Myitkyina. There, AACS personnel were under shell fire for two months, yet they handled landings and take-offs which often were made at a rate of more than one every minute. The regular pattern over the field rarely contained less than 20 planes, and on one morning, 55 were counted. In addition, there was a dropping circle off the southwest end of the runway which added to the traffic jam. And the pattern was further complicated by liaison planes buzzing in and out, and by fighters which, after strafing and dive bombing Jap positions a mile away, came roaring over the field out of their dives.

AACS personnel at Myitkyina handled heavy air traffic despite Jap shell fire which lasted for 60 days.

The difficult Burma terrain and treacherous weather made it imperative for AACS units to be installed at new fields before large scale flight operations began. The advanced fields were usually primitive, with soft spots and dangerous rises. There were also dangerous down currents and overcasts which could have been death traps if the planes had no competent direction from the ground. Some fields—actually nothing more than strips mowed across rice paddies—were difficult to find. Without information from AACS, many pilots would have had to crash land their planes.

The need for navigational aids was particularly urgent in the early morning. Then, when flight schedules were heavy, much of Burma was blanketed by thick ground fogs. Due to this weather, an unusual incident took place at an AACS station south of Bhamo.

For tactical reasons, no homing had been installed at the field. One morning, before the fog had lifted, a pilot called for landing instructions. The tower operator heard the plane but could not see it. The instructions were provided, and a few minutes later the pilot asked, "Where do you want me to taxi for unloading?" The tower operator looked down the runway and saw that no plane had landed.

"Where are you?" he asked. Then suddenly, he answered his own question. "Get the hell out," he shouted, "you're on a Jap field." A few minutes later, the plane came barrelling up from the south, over the Jap lines.

The job of establishing an AACS station is relatively simple. Usually, engineers, who precede the AACS men to the field, have already constructed a tower. The first problem is to move a transmitter into the tower, set up a receiver, and plug in the prewired power lines. Then, a generator is kicked over. The transmitter is "zero beat," a microphone is thrown up to the control tower operator, and the tower is ready to go on the air.

Meanwhile, other men put up all the transmitting antennas, using prefabricated masts, trees, or whatever happens to be available. Power is brought to each operating position and final frequency adjustments are made. Then a cryptographer encodes a message to inform the other fields and a new station is set up for traffic.

An example of the speed with which the AACS men work is seen in an incident which took place at a field near the China-Burma border. Orders were received to move to another field closer to the fighting front. The tactical team waited until dark when flight operations had stopped. Then the station was dismantled, the tower equipment loaded into a borrowed truck, and driven to the new field. The next morning, before the first plane arrived, the tower was on the air. Actually, in terms of flight operations, it had never been off the air.

When Burma tactical situation demanded the establishment of airways traffic control on the doublequick, AACS was on the job

AACS tactical teams are usually made up of nine enlisted men and one officer. They begin their training by setting up a complete station with equipment as it actually will be used in the field. Equipment is carried in specially built crates constructed of light wood for easy handling. All plugs, cords, and remote lines used to connect operating positions with transmitters and generators are prepared in advance. Antenna wires are cut to proper length. Receivers and transmitters are tuned on frequency so that only minor adjustments will be necessary when the team lands. Heavy generators are placed on sleds so that, if no transportation is available, the men will be able to move the 1,400 pound generators into position.

Original tower at Tingkawk Sakan. Tent contains radio equipment.

When a team goes into a far advanced airfield guarded only by a tank perimeter, there is no time for fumbling. "Actually," said Capt. Justus Smith, who commanded the AACS detachment at Myitkyina, "a team doesn't install a new station. It just moves an old, pre-tested station."

At advanced bases in China, where navigation is extremely difficult, the AACS established navigational aids. In the Philippines, when Navy planes had to make an emergency landing on Tacloban strip, men of the AACS brought them in. And, as we move farther up against the Japs, the AACS will be in business at the same old stand.

"This is George Jig tower calling all planes and stations. Come in." ☆

A vital problem in the air war against Japan is to get enough airbases to park the AAF's planes. Here's an idea of what we are up against

Our Pacific Airfields

Air engineer rides his 20-ton bulldozer into heavy growth and trees being cleared away to make room for Superfort base in Pacific.

BY HERBERT RINGOLD

AIR FORCE *Staff*

Our air force from Europe is on the move to the Pacific. From our production lines and depots airplanes by the thousands—B-29s, B-24s, B-25s, A-26s, P-47s, P-80s—are moving in one direction, to the Pacific.

The wishful thinker translates this mass of airpower into an immediate overwhelming knockout air blow against Japan. It is true that we do have the airpower. We do have properly trained personnel. We do know the technique. But, insofar as the AAF is concerned, the "short war" boys have failed to take into consideration at least one important element: *airfields*.

Good airfields to hold our planes do not come off of a production line. Unlike Topsy, they don't just grow. Seizing, constructing, and supplying airfields from which to attack Japan presents one of the most tremendous problems the combined services have ever faced.

The cost in lives to take a small Pacific island is a sobering figure. Four thousand men were killed to win Iwo Jima. On Okinawa, our casualties mounted to 46,319. And as we move closer to the heart of the Japanese defenses, there is no reason to assume that our casualties will be any lighter. In France and Germany, the ground forces did not attack any given area primarily to secure airbases; in the Pacific, many of the costly amphibious operations are made for no other purpose. To get a site for an island airfield, we have to fight a small war.

In the ETO, the job of getting airbases was a difficult one. While aviation engineers did not have to construct any large B-29 fields, building the smaller strips for fighters was definitely no cinch. Most of the available area had been battered and mined by the retreating Germans; for many months, Cherbourg was the only usable port through which poured all the supplies for the entire European operation; and the engineers worked under the pressure of a fast moving war.

Yet, compared to the problem in the Pacific, the task in Europe was relatively simple. In France, only small fields were needed to hold fighter planes and medium bombers. Any strip, 5,000 feet long, was more than sufficient, and it was not difficult to find a level stretch of ground a mile long and 300 feet wide. Usually, it was necessary to move only 30,000 cubic yards of earth, slap a portable landing mat on it, and be ready for operations within a week or two.

Bases to hold B-29s, however, must be constructed with a firm rock base and a paved surface. When a 135,000-pound airplane lands on an airstrip, three feet of compacted rock base are needed to hold it. To operate successfully under combat conditions the Superfortresses should have a runway approximately two miles long and 500 feet wide. There must be parking facilities, dozens of miles of taxi space, and hundreds of hardstands, all of which also must be paved. The approaches have to be free of mountains and other obstacles for 15 miles at each end of the runway. And, instead of moving 30,000 cubic yards of earth, it is often necessary to move a million cubic yards of ground.

When the AAF aviation engineers went into France to build airfields, their supply problem for the most part had already been licked. Practically everything necessary was available in England. Few permanent warehouses or supply depots were required because the fields were to be used for only a short time. The ground forces advanced rapidly; the fighters providing air-ground cooperation moved up with them. And, in an emergency, there were always more aviation engineers nearby to help.

In the Pacific, the supply problem is staggering. Most of the islands on the road to Japan are barren, devoid of lumber, drinking water, electric power, and almost everything needed for airfield construction. There are no buildings that can be used for hangars or warehouses. The nearest supply depots are thousands of miles away. There are no storage facilities for the millions of gallons of aviation gasoline which are required. Everything necessary—every foot of lumber, every inch of wire, every tractor and bulldozer—must be hauled across thousands of miles of ocean to a central supply center. There it is unloaded, then loaded onto assault boats, unloaded a second time at the point of invasion, and lifted, hoisted, floated, snaked, dragged, and driven through surf and over soft sand to the beachhead. And then, the problem is only begun.

Let us select a hypothetical island somewhere in the vicinity of the Ryukus group and discover what it takes to put a B-29 airfield on it.

Landing mats are rolled ashore.

Engineers under sniper fire work on airstrip with slung rifles.

To build and equip a field, approximately 200,000 tons of supplies, material and equipment are required. That means 40 Liberty ships, and the manpower to load them, the seapower to convoy them, and the airpower to protect them. A minimum of three weeks is needed before the supplies reach island X from the States. Then, after the Marines

(*Continued on Page 60*)

Asphalt-blacktop plant on Saipan manufactures strip topping.

THIS IS YOUR ENEMY

. . . it's your life or his

"The entire Japanese Naval Air Service has become one great suicide squadron."

Harvest Time in Japan. Japanese air prospects are glum. Tokyo propagandists have been summering in the warm hope of sudden returns on the Jap-Nazi exchange of information—especially that about radar, buzz bombs, and jet planes. Suicide attacks have given the Japanese a cold kind of encouragement. Propaganda about increased aircraft manufacture has done little to obscure the fact that front-line air strength is down. Reasons for the dwindling totals are simple—losses in the Okinawa campaign, B-29 punishment of production centers, and fast deterioration of equipment. The last cause has been weighted by poor maintenance; sometimes the availability level of aircraft has sunk very low.

The current first-string among the Jap propellered aircraft runs something like this: George, Sam, Jack, Frank, and Zeke 52. Second string, but on some missions very much in evidence, are Tony, Tojo, Irving, Nick, and Zeke 32. An Allied pilot who has recently flown the George rates it high on take-off, speed, climb, dive, and pilot's vision. He also thinks well of the instrument layout and rudder and elevator control. On the bad side he lists stalling characteristics, heavy ailerons at high speed, inferior brakes and landing gear. On the whole, he concludes, George is inferior to Jack.

In general Jap aircraft equipment has shown improvement this summer. Both caliber and number of guns have increased. The old boiler-plate protection and primitive self-sealing gas tanks have been improved. So have Jap radios in such planes as Frank and Tony, although in general this is a field where the Japanese still lag.

Division of labor between Jap Army and Navy air services has been made more distinct. About half the Army force is based around Tokyo. The rest is scattered in Malaya, Burma, China, Korea, and Manchuria. The Navy, with a much larger rate of monthly replacement, has based a large percentage of its planes in the Empire proper. Most of this strength was focused on the Okinawa campaign. For propaganda purposes the Japanese have announced, "The entire Japanese Naval Air Service has become one great suicide squadron." Maybe so.

Propagandists have also taken up the subject of the Japanese air warning system. That has the man in Tokyo and Nagoya streets worried. "Never fear," the capital assures him, "we know when the American planes are coming." On the side of fact, the Japs have learned something from the Germans and are gradually improving their warning system. As potential targets for each mission increase, Hirohito's fighter control people are going to have to choose where to commit their fighters. Any Luftwaffe experts who may be spending their vacation in Japan will assure the JAF that this is no pipsqueak problem.

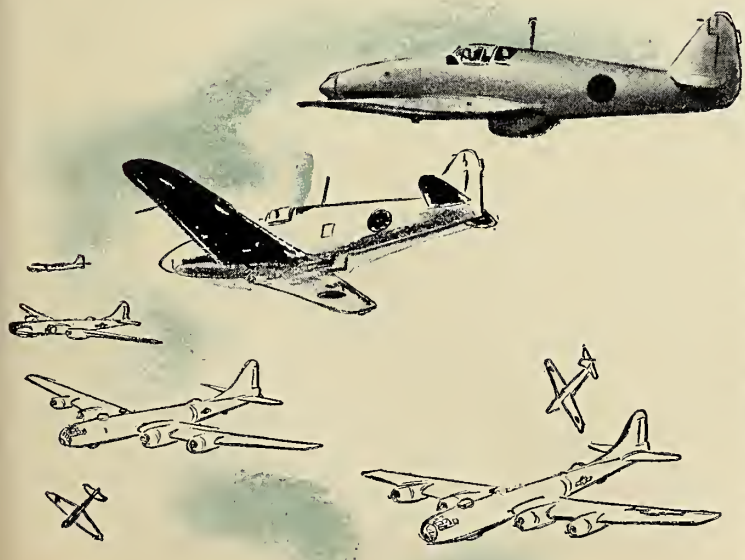
Countermeasures, Air and Ground. In retaliation for B-29 bombing, the Japanese have threatened mass attacks on the United States by bomb-laden balloons. These vengeance weapons—not to be confused with the loose-flying contrap-

tions that have already landed in the U. S.—will cross the Pacific "in about 100 hours at 50,000 feet." At the controls will be "death-defying pilots." In the interim before this kind of operation, Lt. Col. Shozo Makijima, Jap Army spokesman, is irked by the refusal of the United States to confess the havoc already wrought by Jap balloons. "We can surmise," says the Colonel, "that they are wrecking the enemy country." No surmisers are needed to add up B-29 damage in Japanese cities. First-hand witnesses will do. To encourage onlookers, however, the air defense people in Tokyo have pointed out the virtues of old-fashioned running. The idea is to keep on a lookout for bombs. "You can run a great distance," the Japanese are assured, "after sighting the explosive."

Jap Share-the-Work Formations. Cooperation is a fundamental rule of Japanese Intereeptor Unit tactics. The unit usually consists of 64 planes, divided functionally into 32 KO (fighter vs. fighter) and 32 OTSU (fighter vs. bomber) planes. Four KO fighters are fitted for two 30 kg. Mk. 3 bombs. In two-plane elements, these planes attack from a head-on position, releasing their air-to-air bombs so as to disrupt the Allied bomber formation as much as possible. Twelve KO fighters provide their cover. The remaining KO fighters fly above the OTSU planes and protect them at the beginning of the interception. After the bombing, the four air-to-air bombers join their cover. The KO's are then ready for Allied fighters, while OTSU planes attack the bomber formation. In two-plane elements, they approach from the front. In a training directive widely distributed to the pilots of these planes, the most emphatic instruction is, *Make the first pass count.*

Other Jap air-to-air routines include attacks made in pairs or singly from the front and two or three thousand feet up. After an easy dive to several hundred feet above the bomber formation, the attacking plane lets its bomb go, and tries a getaway from chandelle to right or left This maneuver is open invitation to a belly shot. And then there is the air-to-air attack that mixes bombing and shooting. Japs in a row come in at 12 o'clock; the first and second plane approach high, let their bombs go, and dive away to right and left. The other planes come in shooting.

"Other Jap air-to-air routines include attacks made in pairs or singly from the front . . ."



"Shanghai has become a city of rumors."

It Says Here. Japanese radio and newspaper commentators have pulled out all the stops. Occasionally the echo sounds sour, but their verbal tactics don't lack variety. Domei, the news agency, announces for the Society of Metallurgy that the B-29 was made possible by the Japanese discovery of duraluminum. . . . About the same day the newspaper Mainichi wipes out all the B-29s with arithmetic. Of 135 Superfortresses manufactured monthly, 30 are lost through wear and tear on the way to places like Saipan. About 10 percent are lost in Japanese bombing raids on American fields. Of the remaining 90 that go into combat, 15 are lost on each of 6 monthly missions. . . . Hsin Shun Pao, organ of the Jap forces in China is not optimistic; "Shanghai has become a city of rumors. Root out the rumors or we have no more hope." . . . In the magazine Taiyo, Captain Yumichi Yamazaki declares, "American aggressive spirit derives from absolute superiority in numbers and power, absolute reliance on scientific weapons, and confidence in defense and rescue applianees. It is vexatious to us Japanese to think that air-sea rescue appliances of their Flying Boats picked up 40 of their airmen and restored their morale" . . . Domei has announeed the establishment by the Imperial Government of a Committee - to - Inquire - Into - Measures - for - Improving - the - Politieal - Treatment - of - the - Chosenese - and - Taiwanese Brethren. . . . Kazunobi Kanokogi, Director of Japan Publie Opinion Information Association, eoncludes, "Our step by step retreat has been due to lack of scientifie and industrial techniques, shortages of shipping, and laek of aircraft. . . . Should we perhaps be defeated, it would be the punishment for our sins in not conforming respectfully and sincerely to the Imperial Rescript of War. The greatest battle of 1945 will be within ourselves." . . . Domei has announced that hereafter the military police in Tokyo will "pay attention to speeches, literary works, meetings, organizations, and rumors." . . . From the same source comes this advice: "We must have no joy or sorrow in quick alterations of war. One cannot deny that the enemy's counter-offensive formation has reached our boundaries. Now the battle begins."

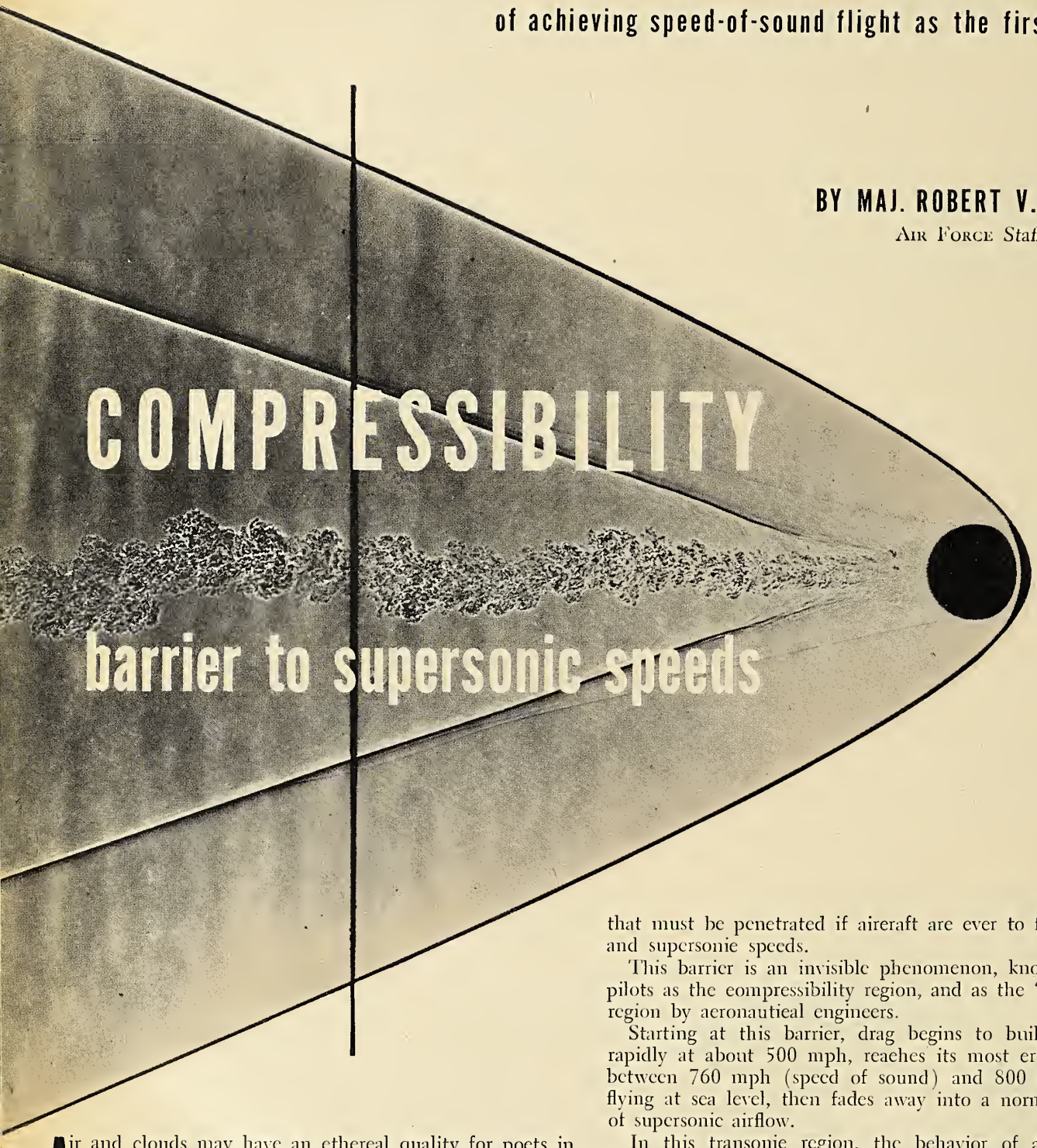
Echo from the Western Front. The Luftwaffe's adaptation of an old recognition story caps the final account of the GAF from the ground. You can always tell the nationality of an airplane, declared the huffy Wehrmacht Leutnant; you ean tell just by looking at it. If it's shiny, why it's American. If dark, it's British. But if you ean't see the thing at all, it's German. . . . Dr. Kurt Tank, designer of the FW190 and the German planes bearing his own name, has issued his post-surrender prophecy about jet propulsion. Among ultra-high speed jets, says the Doktor, the single-engine types are most promising. Two engines, he thinks, spoil the wing line. . . . As the Wehrmacht scrambled toward defeat, the Germans were about to put into mass produetion three special antiaircraft deviees. ☆

Although flight in excess of 1,000 miles per hour is theoretically possible, we are only on the threshold of achieving speed-of-sound flight as the first hurdle

BY MAJ. ROBERT V. GUELICH
AIR FORCE Staff

COMPRESSIBILITY

barrier to supersonic speeds



Air and clouds may have an ethereal quality for poets in their flights of fancy, but to our more realistic airmen they are mostly a great big pain in the neck.

Every flyer knows that even soft and feathery looking cloud fluffs can be rough as hell and that the invisible air is so un-soft that the faster we fly through it, the more it batters up our planes.

More and more difficulties are being encountered in just getting through the air at high speeds. This is one of the problems being encountered by the AAF's family of new combat planes in the 250-500 mph speed ranges. Above these speeds, there is an even more serious barrier that must be penetrated if aircraft are ever to fly at sonic and supersonic speeds.

This barrier is an invisible phenomenon, known among pilots as the compressibility region, and as the "transonic" region by aeronautical engineers.

Starting at this barrier, drag begins to build up very rapidly at about 500 mph, reaches its most critical point between 760 mph (speed of sound) and 800 mph when flying at sea level, then fades away into a normal pattern of supersonic airflow.

In this transonic region, the behavior of air changes abruptly over any object from a smooth flowing stream to an irregular series of violent waves. This occurs when the air moves so fast over the wing that it reaches or exceeds the speed of sound and generates a "shock wave." By-product of shock waves is severe turbulence that causes serious buffeting of the tail and stalling of aileron control surfaces, recognizable symptoms of compressibility trouble in flight. Such shock waves oscillate so violently at sonic speeds that they destroy normal airflow over the wing, thereby changing lift and increasing drag forces. Such changes destroy the effectiveness of the tail surfaces in

maintaining the normal balance of an airplane, requiring a pilot to exert abnormal forces to maneuver it.

In the absence of an effective tail surface at very high speeds, such as dives, excessive trim tab deflection must be used to maintain balance. But, when the plane slows down enough for shock waves to disappear, tail surfaces regain their effectiveness so suddenly that the pilot must take great care to retrim the airplane to prevent violent flight reactions. It is in this recovery phase from high-speed dives that most structural failures are likely to occur.

Rocket projectiles can be battered about by shock waves and sometimes are diverted from their pre-set trajectories as they pass through the compressibility region. Despite this effect of shock waves at sonic speeds, however, rockets can accelerate through the sonic speed range and resume normal flight characteristics at speeds well above 1,000 mph.

Once beyond the speed of sound, aerodynamicists believe that aircraft can be controlled as precisely as artillery and rocket projectiles at supersonic speeds, providing the basic design of the wing is modified to minimize the effect of shock waves. Such redesigning, however, requires application of theories that can control the formation and eliminate the effects of oscillating shock waves at supersonic speeds. Previous theory for aircraft flying at speeds of 100 to 400 mph treated air as a fluid with a near-constant density and flow-pattern throughout the range of sub-sonic speeds.

Strange though it may seem in our world of science, there is no reliable information on the flow and reactions of compressible fluids on an airfoil at sonic speeds. Not even the long-haired professors have been able to determine a reliable flow pattern for air in the transonic region.

The only generalizations about our knowledge of the transonic region are that there is more unknown than known, and until we learn how to minimize the effect of shock waves or change the flow of air over wings at high speeds it will be extremely difficult for airplanes to exceed the speed of sound.

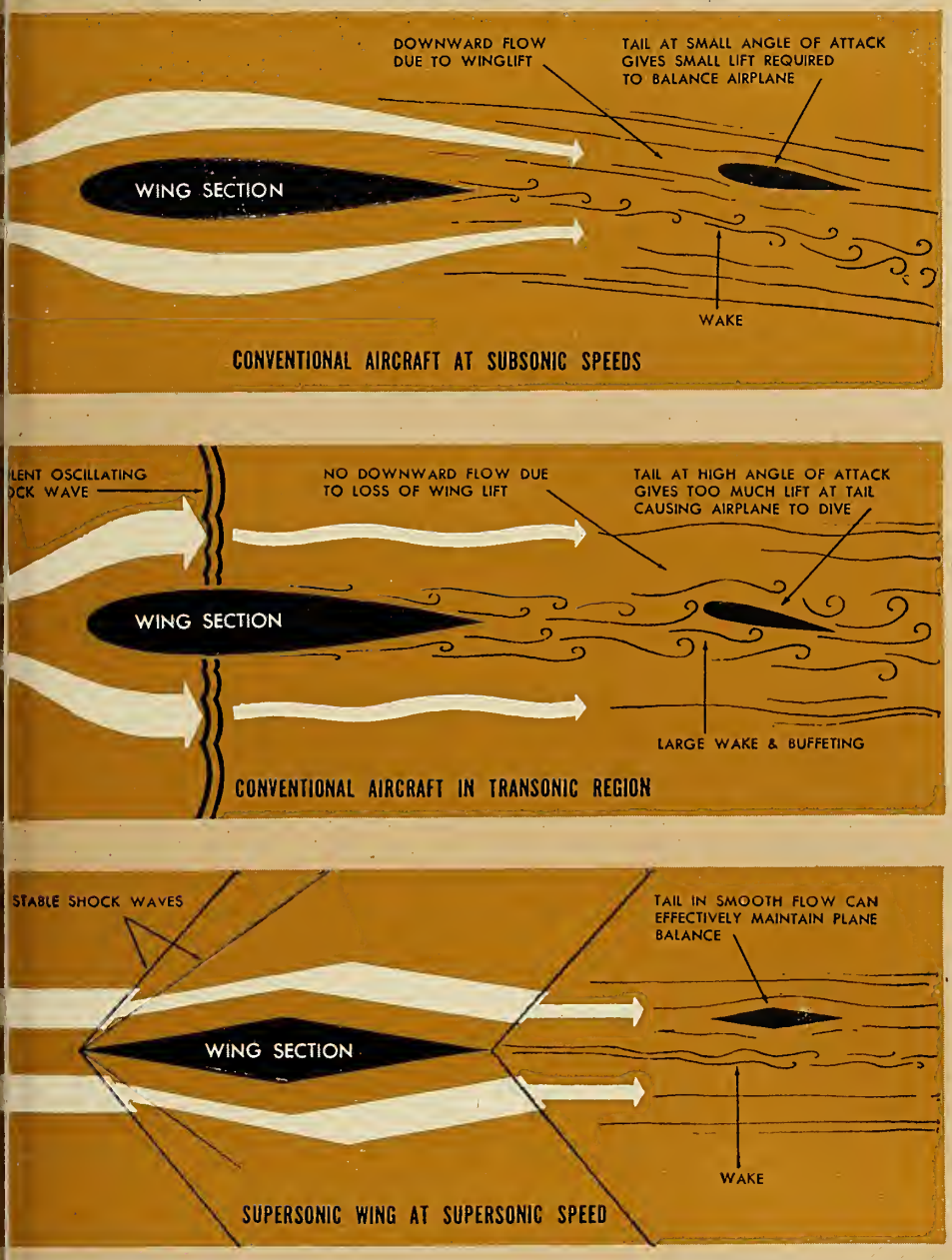
Between 700 and 1,000 mph in sea-level flight, where shock waves exert their most adverse effect on wings, no data from wind tunnels is available. The all-too-simple reason is that no wind tunnels have yet been built that can run accurate tests in this speed range. Some of the tunnels themselves exaggerate compressibility effects while others are so narrow that shock waves bounce back from the walls onto the airfoil being tested, thereby destroying the true airflow that would be encountered by a wing in free flight and invalidating test results.

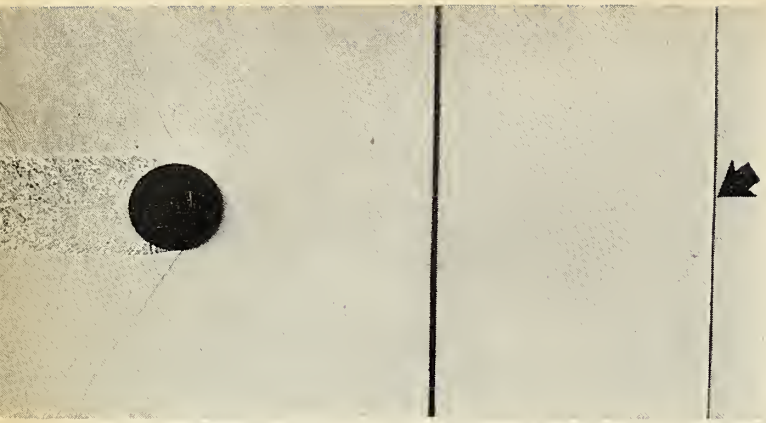
In the absence of wind-tunnel information, test pilots are seeking some of the answers to the phenomena by diving planes at speeds well over 600 mph. Shock waves in these test dives cause such powerful unbalancing forces that inexperienced pilots easily can lose control of their planes. The bending moments on wings in pull-outs from these high speeds have buckled the skin between some rivets and vibrations have cracked coolant radiators. Yet, even these flight tests cannot be relied upon. Carefully instrumented reports of 600 mph dives have such flaws in them as instrument lag and error caused by rapid temperature and altitude changes which must be registered at the rate of 3 degrees Fahrenheit per second and 900 feet per second.

Only recently have airplanes been able to fly in straight-away flight at speeds where very severe shock waves are encountered. The P-80 and an experimental P-47 both have maintained level flight, despite shock waves, at excessive speeds. From continuing tests of these planes, it is hoped that more accurate flight test data can be obtained to influence future designs.

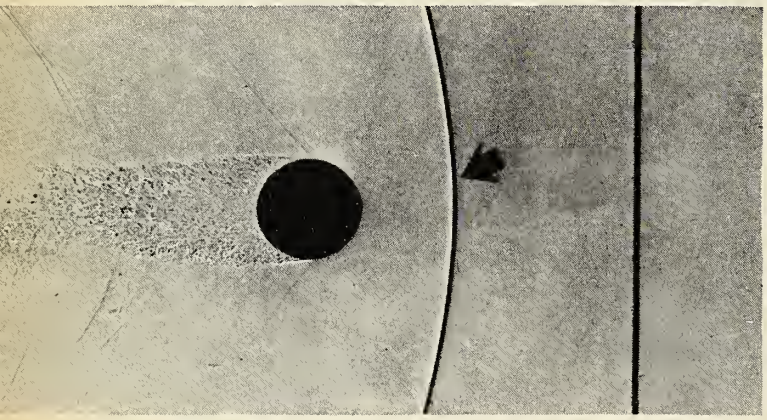
Because conventional propeller-engine type aircraft are limited in performance by propeller efficiency, which falls off rapidly at speeds much over 500 mph, the crystal ball

WHITE LINES INDICATE VELOCITY—THICK SECTION IS HIGHER VELOCITY.

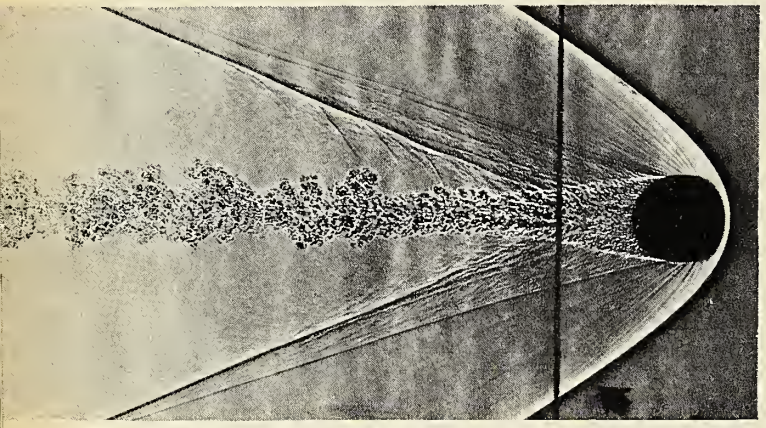




At low supersonic speeds the main drag of sphere is in its wake. Frontal shock waves forming at right (L) contribute little drag.



At higher speeds wake drag is reduced as shock waves build up, become more severe. Total drag coefficient stays about the same.



When sphere reaches very high speeds weight drag is cut more, but very severe shock waves tend to retain same drag coefficient.

of futuristic high-speed planes does not reflect any such aircraft. Instead, sonic and supersonic planes will be jet-propelled because the jet engine increases in efficiency the faster it goes. Besides, it is the only method of propulsion now in existence that can develop enough thrust to hurtle a plane through the air at speeds well over 1,000 miles per hour.

During the past seven years, great strides have been made by our aircraft designers in delaying compressibility difficulties due to the formation of shock waves. Some of the increased speed was gained by simple drag reduction measures such as streamlining antennas, sinking rivets flush with the skin, cutting down on the drag area of coolant ducts and smoothing out angular joints that caused formation of shock waves at low speeds. The rest of the aerodynamic speed increases can be attributed to specially designed high-speed wings that delay formation of the drag producing shock wave. At subsonic speeds, the airfoil increases the speed of the air over the top of the wing. The thicker the wing, the faster the air must flow to get over it; and if the air reaches the speed of sound at any point over the airfoil, a shock wave will form. The thinner the wing, the faster a plane can fly before the shock wave will form. Wing designs for sonic aircraft, therefore, are expected to be very thin.

Supersonic wings also will have very sharp, knife-like leading edges to penetrate the air with disturbance of the smallest possible mass of the surrounding air. This is in contrast to conventional airfoils with blunt leading edges that are efficient at subsonic speeds but unsatisfactory in the sonic-speed range.

Mild shock waves will form on the leading and trailing edges of the supersonic wing, but the flow of air will be smooth over the airfoil. However, when this wing is flown at speeds only slightly above the speed of sound, severe shock waves will form. With enough power, however, a plane can increase its speed until the severe shock wave disappears and the mild ones stabilize on the leading and trailing edges of the wing, permitting normal flight above the sonic-speed range.

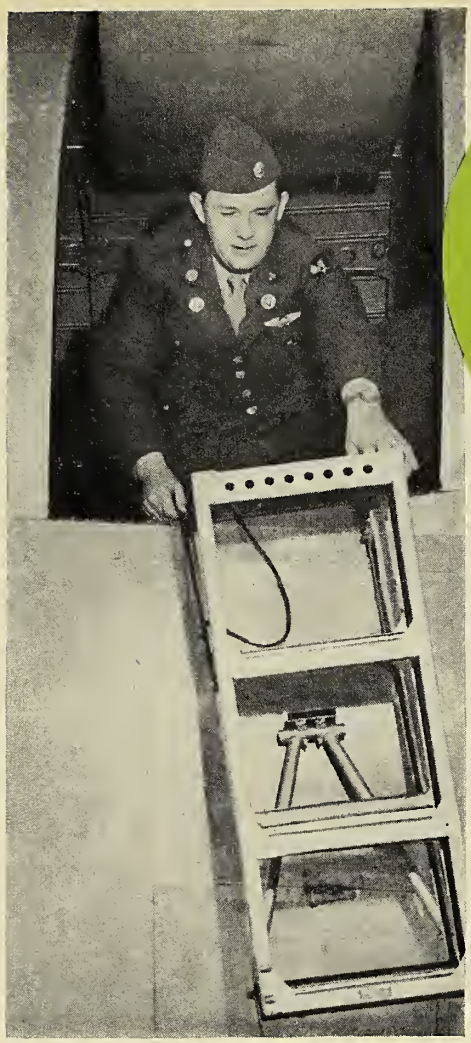
Disadvantage of the supersonic wing is that it is not as efficient at low speeds as the conventional airfoil. For this reason, landing and take-off speeds may be very high, so high that some sort of rocket-assist may be required to give such aircraft the initial speed they require to lift themselves into the air.

Theoretically, all of this is possible and aircraft some day will be able to fly well over 1,000 miles per hour. Practically, we are only on the threshold of sonic speed flight, trying to penetrate the barrier of compressibility in the transonic region. ☆

A pointed projectile at same velocity as sphere in photo No. 3 has same wake drag, but sharp nose eliminates the severe shock wave.

Sky Clerks

BY CAPT. JOSEPH D. GUESS
AIR FORCE *Staff*



Whether it's serving lunch aloft or preparing passengers for a ditching, these ATC flight traffic clerks are ready for the job

"I've got the best job in the Army Air Forces," said the sergeant, an Air Transport Command flight traffic clerk.

The sergeant, red-headed Billy Hughes, had just returned from a 35-day special mission "hop" around the world. His itinerary, from Washington, D. C., included stops at Bermuda, Malta, the Crimea, Iran, India, Burma, Ceylon, Australia, the Admiralties, Leyte, Guam, Saipan, Kwajalein, Honolulu, San Francisco.

While it is true that not many flight clerks get to make globe-girdling missions, FTCs (flight traffic clerks) are the world's most-travelled enlisted men. Most FTCs are in the ATC overseas divisions and have more or less regular runs, such as from Karachi to Kunming, Casablanca to Cairo, San Francisco to Hawaii.

The job of an FTC is highly specialized, with responsibilities such as guarding cargo against damage; maintenance of cabin discipline; proper preparation of customs and border clearance forms; checking, loading and unloading cargo, passengers and mail; carrying important documents; caring for passenger comfort.

The service rendered to ATC passengers is both varied and important. A passenger, without help, might have to work two hours over customs papers; the flight clerk does the detailed work for him, and the passenger merely signs his name. Among his other duties, the FTC serves lunches, awakens sleeping passengers before descent so that they won't be troubled with popping ears, sprays the cabin with insecticides when his plane is in the tropics.

With the ATC's vast air traffic—including frequent unarmed supply missions into combat areas—there's bound to be an occasional mishap. Recently, Pfc. Erman Fountain was on a flight over the Red Sea when some trouble came along. The aircraft had to ditch. Flight Clerk Fountain, under orders from the pilot, took charge of all the cabin passengers. He was the last of 14 people aboard to get out of the ship; all survived. Out over the Atlantic, lightning struck an ATC freight carrier and knocked off the cargo door. Flight Clerk Pvt. Glenn Seaman had to struggle for hours to keep valuable freight from falling out. Sometimes, at isolated bases, the FTC has to pitch in and help the flight engineer and mechanics make quick repairs to engines.

On an average, flight clerks log about 110 hours in the air each month. A large number of the 1,247 ATC flight clerks have logged totals of more than 1,000 flying hours. Two Miami, Fla., brothers, Sgt. Roger Skillman and Pvt. John Skillman have traveled, between them, more than 1,300,000 miles and logged more than 8,000 hours in the air. Sgt. Leland B. Ross has flown across the Atlantic 25 times. Flight clerks are entitled to wear aircrew members' wings after 50 hours of air duty. Of course, they get flight pay. They wear Class A uniforms while flying.

The ATC flight clerk program was inaugurated in August, 1943. The school for training FTCs was recently moved to Morrison Field, Fla. There they take a six weeks' course, then get further training at an ATC port of aerial embarkation.

Because of a shortage of male flight clerks, Waes may soon be handling the job on some routes. They will fly first on the ATC regular London-Paris run. If the experiment proves successful, there will be WAC FTCs on the other ATC "plush-line" short-haul flights. Men probably will continue to work on the more exacting, longer missions.

Prospective flight clerks are carefully selected; they must quickly absorb a lot of specialized training. To get a chance at the job, an enlisted man or woman in the ATC must make a request through channels for the training. If the applicant appears to have the qualities to make a flight clerk, his CO will take necessary steps. Enlisted men or women not in the ATC have little chance to get FTC training.

Of all the qualifications, the ability to think quickly is probably the most important. Although FTCs are encouraged to be honest in explaining mechanical difficulties to curious passengers, at least one FTC has been known to use his head to allay the fears of an obviously nervous passenger. A plane on a long overwater hop developed engine trouble and the pilot had to feather a prop. One important passenger, on his first flight of any kind, noticed the still propeller and with alarm asked the flight clerk if they were in trouble.

"Why no, sir," replied the quick-witted FTC. "You see, sir, we just noticed there is a very strong tailwind and the pilot decided to cut off an engine to save fuel."

"Oh," said the passenger, relaxing in his seat with vast relief, "Well, that's all right, that's just fine." ☆

Where Weather Is Born

BY CAPT. L. P. BACHMANN

Air Force Overseas Staff

North China-based B-25s are the bellwethers for our very heavy bomber operations

A Chinese soldier stands guard in front of the C-47 used to supply weather stations.

The largest single squadron in the AAF is a weather outfit stationed in China. Its personnel, under the command of Col. Richard E. Ellsworth, numbers more than 2,000 men; its assignment is to provide weather information for the 20th Bomber Command, the 14th Air Force, ATC traffic over the Hump, and for Army and Navy operations in the western Pacific from the Philippines to Japan.

Our weather stations in northern China are located near the areas where Pacific weather is born. Weather for the Pacific, particularly over the islands of Japan, originates in Siberia, Mongolia, and northern China. The findings of the weather squadron definitely established that a high cell which rises and moves across Siberia and the Gobi Desert is one of the most influential factors in determining meteorological conditions throughout the world.

The most important discovery of the weather squadron was the fact that this Siberian high cell did move. Previous information concerning it stated that the high sat in Siberia like a frozen wall and stopped all weather that flowed in from Europe. However, AAF weathermen proved that certain types of fronts, under special conditions, will move across from Europe and affect China in four or five days.

From all this, it has been definitely established that weather moving across Mongolia and northern China affects the Japanese islands and surrounding territory approximately 24 hours later. Bad weather in the Philippines can be forecast when the high cell in northern China moves southward, then to the east. This was the case during the Philippine invasion of October, 1944, when a terrible month of rainstorms hampered our troops on Leyte. Evidence of the far-reaching results of weather starting in this area is the forecast that predicted snow on the U. S. west coast from observations made of a high cell swinging lower than usual through China. The forecast proved to be accurate.

There were many problems to be overcome before weather stations could be established in China. Operations

Predicting the weather for the next day's operations is job of S/Sgt. William Huke, T/Sgt. Robert Clar, and S/Sgt. James McTernan.

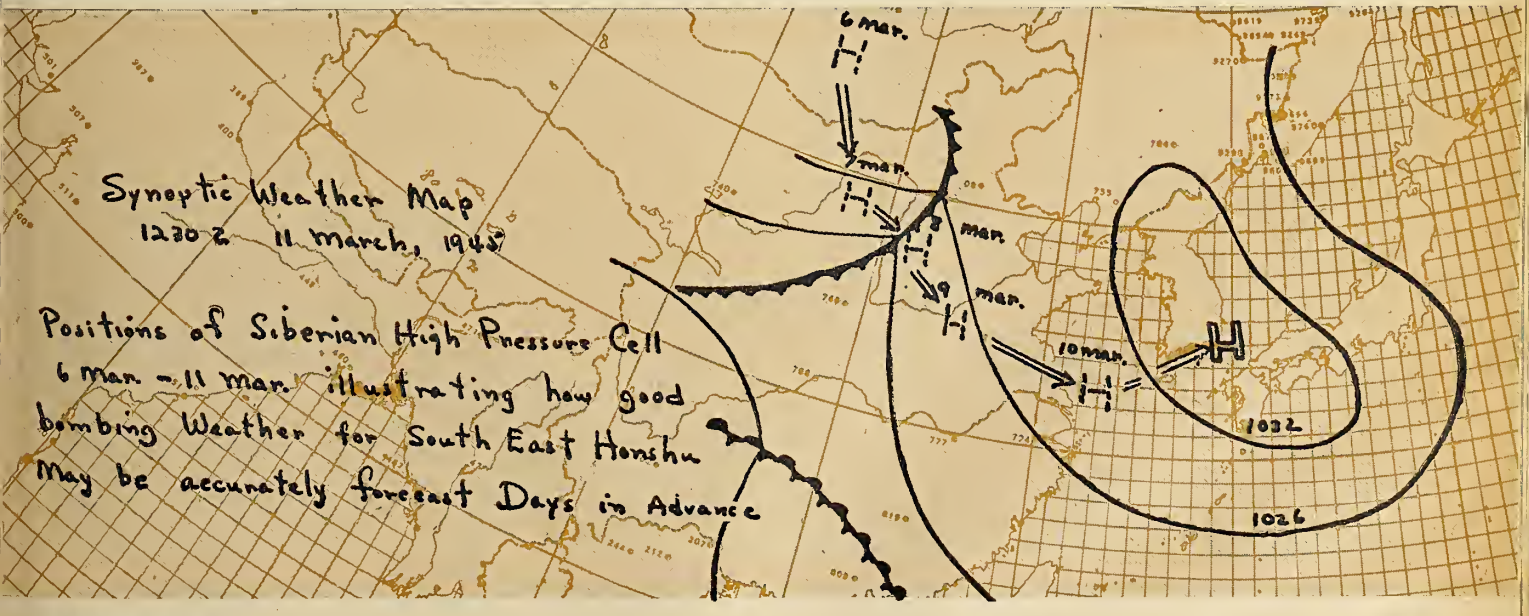
Planes which travel to the weather stations scattered throughout China may land on sun-baked fields in the Gobi Desert or on snow covered strips in northern China. The plane parked next to the two C-47s is a Russian SB-3 used by the Chinese as a medium bomber.

were carried out in extremely remote sections, facilities were few, and the supply line unusually long. Only two C-47s were available to transport materiel to the isolated stations. This resulted in a complex juggling of loads and weights, due to the fact that most of the C-47 cargo space was filled with gas drums for refueling. All missions had to be flown in only CAVU weather because a forced landing meant coming down in strange territory where chances of rescue were slight. Food was scarce and temperatures at some stations, where men would be isolated for months, ranged to 30° below zero. Nevertheless, the job was done. Now, daily weather forecasts are dispatched to Army and Navy combat stations throughout the Pacific area.

To gather the various types of weather information necessary for accurate predictions, three principal methods are employed: visual or surface observations, upper air and wind observation, and observation from aircraft in circumstances where no ground stations exist.

Most weather stations take upper air and wind observations by means of a radiosonde and rawin. In both these operations, a hydrogen-filled balloon, carrying a small transmitter, is set free and tracked up to 60,000 feet by special instruments which interpret the impulses sent out by the transmitter. In the radiosonde, the interpretations are for temperature, pressure, and relative humidity; in the rawin,

(Continued on Page 46)



SOME QUESTIONS AND ANSWERS ON REDEPLOYMENT IN THE AAF AND HOW IT AFFECTS *you*

1. What may an eligible enlisted man do to effect his release on points? He can only wait until he is notified that he is available for release. The AAF intends to release eligible men as rapidly as practicable, but no man in a critically short MOS (military occupational specialty) can be spared until a replacement is available for him. If a man is eligible for release, his organization is aware of it and will make him available as soon as possible.

2. What is a critically short MOS? It is any MOS in which a 15 percent shortage is expected to exist during a four-month projected period. However, individuals may be retained for military necessity in specialties in which the shortage is substantial but less than 15 percent. The AAF list of critically short MOS's for enlisted men numbered 48 on V-E day. The War Department list contained 21.

3. What kind of reporting system has been established to keep Headquarters advised of eligible enlisted personnel? A recapitulation has been made to show the number of enlisted men eligible for release, where they are stationed and what their specialties are. Beginning June 30, the monthly personnel status reports (Form 127) must show the number of personnel in each critical MOS and the number eligible for release. This report begins at unit level and is consolidated at each echelon all the way to Headquarters AAF. Thus, Washington is aware at all times of the number eligible for release and the number available for duty in each specialty.

4. Are enlisted men who are released actually separated from the service or are they, like most released officers, merely placed on inactive status and subject to recall? Enlisted men are actually separated from the service.

5. Is the critical Adjusted Service Rating score the same for AAF ground personnel as for flying personnel? Yes.

6. Which will be higher, the percentage of officers released or the percentage of enlisted men released? The percentage of officers released. As one principal reason for this, the attrition rate for pilots has been considerably lower than anticipated, causing a pilot overstrength.

7. How will redistribution stations take care of the increased load of returnees to be processed and reassigned? As the flow of personnel through redistribution stations increases, the length of the individual's stay at these stations is reduced. Also, additional posts or stations may be used as redistribution stations.

8. What becomes of the rotation program? Rotation, as such, has ceased for ground personnel. As before, war weary aircrews will be returned to the United States as the theater can spare them. Also, at the discretion of the theater commander, eligibles who must be retained, as well as ineligibles with long overseas service, may be returned to the United States on temporary duty for rest and recuperation up to 45 days.

9. What is a returnee? An individual who has been returned to the United States after serving six months or longer overseas.

10. May returnees volunteer for second tours of duty overseas? Yes, and if they are needed they will be sent over. However, except for volunteers, returnees will not be sent overseas again until all others in the same MOS who are physically qualified and ineligible for release have gone overseas. Returnees who are sent over again will go generally in the same order in which they returned to this country.

11. What is the procedure for handling an individual who is eligible for release and is brought back to the United States as a casual? He leaves the theater as a member of a reception station group, organized on the basis of home addresses. From the port of debarkation, he proceeds to the reception station nearest his home. There, his essentiality is determined by the commanding officer of the reception station in collaboration with the AAF liaison officer. If the individual is found non-essential, he goes to the separation center on the same base and is separated from the service. How long this process takes depends upon the extent to which the separation center is overloaded with personnel awaiting separation. If, at the reception station, it is determined that the individual is essential and must be retained in service, he goes home on RR&R (recuperation, rehabilitation and recovery) up to 30 days, at the end of which he reports to a redistribution station for processing, possible reclassification, and assignment to duty in the United States. If necessary, he may go overseas again later. (See Question No. 10).

12. What is the procedure for handling an individual who returns as a member of a unit that is to be demobilized? Here the individual comes back to the U. S. with his own organization rather than as a member of a reception station group. At the port of debarkation, the unit goes to the port staging area. Then each individual member of the unit is placed in a reception station group for movement to the reception station closest to his home. From there on, the procedure is the same as for the individual who returns from overseas as a casual (See Question No. 11).

13. What is the procedure for an individual who returns as a member of a unit to be redeployed through or to the United States? Upon arrival at the port, the unit goes to the port staging area, where its members are divided into geographical groups and are transported to reception stations near their homes. From there, they go home on RR&R, at the end of which they report back to reception stations to be taken to reassembly stations. There units are reassembled, remanned if necessary, and sent to stations for accomplishment of redeployment training.

14. What is the procedure for an individual who is ineligible for release and returns as a casual? From the port of debarkation, he goes with his reception station group to the reception station nearest his home, then home on RR&R, and back to the reception station. Then he proceeds to a redistribution station for processing, possible reclassification and assignment to duty in the United States. (See Question No. 10).

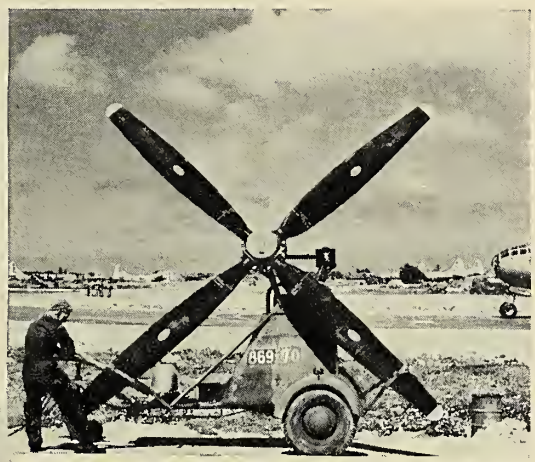
15. Do the procedures described above

(Continued on Page 62)

Based on Guam

The bitter, bloody campaigns that were fought to wrest tiny, strategic islands from Jap hands are now paying off as our chain of Pacific airbases goes into business on a grand scale

Stacked at field's edge, this reservoir of bombs will be drawn on to load bellies of Guam's Superforts for missions over Jap homeland.



Mech straps Superfort's prop onto carrier.

Refreshments for this crew back from Tokyo raid.

Sergeant heads for processing lab to get results of shots taken on mission that has just been completed.

Between missions, B-29 gets thorough check from its ground crew.

Here's the latest dope on AAF's helicopters, their operation, use in combat theaters and the training of rotary wing pilots and mechanics

AAF YR-6A

progress report on eggbeaters

BY MAJ. LUTHER DAVIS AIR FORCE *Staff*

They're hard to fly. That's the first fact most of us have to learn about present day helicopters. The contraptions look so light and foolproof that helicopter pilots frequently are badgered by people asking to be "checked out in the things" as if the process were as simple as transition from an L-1 to an L-4.

If you want to fly the AAF's R-4B, R-6A, or R-5 (the "R" stands for "Rotary Wing") you have to go to school again no matter how many pilot hours you have behind you—and you have to work like hell to master new theories and new techniques. All students are volunteers (flight officers, second or first lieutenants who are rated pilots or service pilots on flying status), and all understand that their primary duty after completion of the six weeks' course will be flying helicopters—probably overseas.

The school is at Sheppard Field, Texas, where it comes under the AAF Western Technical Training Command and is headed by Lt. Col. B. F. Witsell. At its present scale it takes a class of 25 pilots every six weeks. Half of the students are returned combat pilots; the rest are either from the continental air forces or men who have had experience as instructors and are slated to teach helicopter flying.

They get a lot of ground school before they're ready for their first ride. The trainer is the Sikorsky R-4B which has been to helicopters approximately the work horse the old Jenny was to fixed-wing aircraft. There are dual controls side-by-side and between the seats is a lever familiarly called the "pitch stick"—the handle of which is a motorcycle-type throttle. The rest of the controls look deceptively like a conventional airplane's—rudder pedals, control stick, plus the basic instruments.

The pilot starts the engine, gets it running smoothly, and then engages the clutch—another lever between the seats. The rotor above and the tail rotor behind begin to move. There's a swish-swish sound from the windmill overhead and considerable racket from the 185-horsepower Warner engine.

After completing the prescribed before take-off checks, the pilot begins to pull up on the pitch stick between the seats while commensurately adjusting the throttle by turning the pitch stick handle. With his other hand he holds the control stick centered, and, as the degree of pitch of the main rotor blades and the rpm increase, the aircraft begins to rise—straight up. At this point the average student on his maiden direct-lift flight usually looks down incredulously at the wheels, motionless a few feet above the take-off point.

Push the control stick a trifle forward—thus tilting the main rotor—and the helicopter begins to move ahead gaining altitude as forward speed is gained. If hovering, move the control stick to the right, and you go squarely sidewise; backward, and, yup, you go straight to the rear at a very good clip.

With the aircraft flying forward at a reasonable speed—indicating between 50 and 75 mph in the R-4B—you can use the control stick almost as in conventional aircraft, except that it is incredibly sensitive and seems to have a will of its own. It vibrates noticeably and revolves in a small circle between your knees, making hands-off flying absolutely impossible. A hairsbreadth back on the stick and you gain altitude, a hairsbreadth forward and you lose it. A slight movement to one side and you bank and turn in that direction. Your rudder pedals are to control the counter-torque rotor on the tail and are used mainly to align the fuselage; to point it in the direction in which you're going—two things which are not necessarily the same in helicopters. You proceed in the direction the main rotor is tilted, while the fuselage has a tendency to weathervane into the wind. Thus with a strong westerly wind a helicopter might be moving due south with the fuselage pointing toward the southwest.

The extreme sensitivity of the controls and the fact that there's a definite time-lag between a control movement and a change in attitude of flight mean that the pilot has to think ahead continually. For instance if a thermal or updraft makes you begin to rise, you must push slightly forward on the stick to correct for it and, almost before this movement of the stick has taken effect, correct for the

Here's a demonstration of one of the more convenient characteristics of the helicopter. Short of gas, some R-4s have landed in an Oklahoma cornfield for fuel, directions — and lunch.

Controls of the R-6 Helicopter. In the pilot's left hand is the joy stick; right hand, pitch stick with throttle handle.

An R-4 with flotation gear attached alights on an AAF airfield on Iwo Jima. Wherever they go helicopters gather a crowd.

initial correction by pulling back slightly on the stick—or you'll find yourself behaving like something on a roller coaster. Should you pull too sharply back on the stick you'll come to a dead stop in midair—stopping, incidentally, more quickly than an automobile could at a similar speed—and begin to go backward. Almost every major change in speed or attitude requires a compensating change in pitch and throttle.

Perhaps you'll see why the AAF Helicopter School has washed out pilots with as much as 4,500 hours of fixed-wing time behind them. Today they average about one washout per class of 25, and it's almost always a guy who simply can't coordinate all five controls sufficiently well.

Many helicopter experts believe that the ability to pilot fixed-wing aircraft is no real advantage in learning the actual control technique of helicopters. However, the AAF works on the theory that once the physical knack of rotary wing flight has been mastered, general pilot ability and air-mindedness pay off in making helicopter pilots more versatile and better able to do the wide variety of jobs that may be required of them. Thus the "eggbeater" boys were all fixed-wing pilots first and they wear the wings of their original pilot rating.

They get between five and eight hours dual before soloing and after that enough solo and dual to bring their total helicopter time to 27 hours or more. Before completion of the helicopter course, pilots must be able to land on a dime (literally), fly the square—meaning to fly an absolutely square pattern using forward, sideward, backward flight—hover precisely over a given point, and accomplish a maneuver called piercing the target. In this, a ring a few inches in diameter is held aloft on a pole. The "eggbeater" has a dowel a foot or so in length attached to the nose. The pilot must inch his plane forward, pierce the ring with the dowel, lift it off the pole, and return it to the hands of the instructor.

After a man has completed his 27 hours in the R-4B and been exposed to 70 hours of ground school he is ready for transition to the R-6 which is a sleeker, faster, longer-range helicopter. Also of Sikorsky design, it is powered with a 245-horsepower Franklin engine, cruises about 100 mph, and has about double the range of the R-4. This seemingly simple transition course requires 10 hours flying and 24 hours ground school.

With that much training behind him a pilot is ready to be assigned to duty. This might be to the Helicopter School as an instructor, to an emergency rescue squadron for work in an active theater or to a variety of special jobs such as flying off an AAF Aircraft Repair Unit (Floating)—a Liberty ship fitted out as a subdepot for roving service in the Pacific—or to an active theater for liaison, observation work and odd chores.

A new helicopter pilot is very apt to become a kind of missionary for direct-lift aircraft. He goes out to duty full of zeal for his eggbeater and for the peculiar capabilities of the craft. He often has to sell the idea that he really can hover in mid-air, that he really can pick up a man by rope ladder without landing at all. Having converted people to an appreciation of the capabilities of helicopters, he frequently then has to unsell them a trifle—convince them that his gadget has definite limitations. Hovering is the most expensive thing a helicopter can do—expensive in terms of fuel and demands on the powerplant—and there are conditions under which the R-4B, which is slightly underpowered, and even the newer types, cannot hover or ascend vertically. Ideal helicopter conditions are a cool day at sea level with a slight (about 10 mph) wind blowing. In still hot (thin) air at an altitude of 1,000 feet or more above sea level, the helicopter hovers with increasing diffi-

culty. Under such conditions the R-4B or an overloaded R-6 might have to indulge in something called a jump take-off. In this operation the pilot takes off by gaining forward speed immediately and without hovering in order to increase lift. Under extremely adverse conditions, the pilot may resort to a running take-off. It's a cinch he'll require less of a run than any known fixed-wing aircraft, but still he may not be able to rise like an elevator as he can at sea level.

It is only the hovering and vertical ascent qualities of helicopters which are thus affected by altitude and extremely hot air. R-4Bs have successfully flown well over 5,000 feet and their service ceilings seem to be limited only by their powerplants which are not yet supercharged. It follows, however, that certain obvious uses of helicopters in mountainous terrain—hovering to pick a man off a crag or cliff, say—might be limited by weather and temperature as well as range.

Recently the Helicopter School ferried 17 helicopters from Illinois to Texas. Here are some of the R-4s giving Tulsa, Okla., a view of the eggbeaters in formation.

The safety factor of the helicopter is something which usually requires explanation to the uninitiated. First, it should be said that the entire history of American helicopters includes very few fatalities—they could be numbered on one hand—but it should be understood that the thing is not yet an old lady's dream method of transportation. If the helicopter has forward speed so that there's sufficient airflow through the main rotor, in the event of engine failure the blades will autorotate if pitch is reduced immediately; in other words reduced lift is available without power and the craft can glide to earth. However, if the helicopter is hovering, altitude must be sacrificed in order to pick up sufficient forward speed to keep the blades moving. Thus the danger altitude for hovering is between 30 and 300 feet above the ground. At under 30, you're not high enough to hurt yourself; at over 300, you have enough height to pick up the forward speed necessary to sustain autorotation.

Another source of popular misunderstanding of helicopters has to do with its ability to fly in bad weather. It is true that the helicopter can hedgehop cross country under a ceiling of less than 100 feet—a ceiling that would ground ordinary planes. It is also true that if a helicopter pilot gets lost in weather he can stop cold, descend slowly and ask directions or read a road sign. He is not forced to keep roaring around in the murk at more than 100 mph until he runs out of gas or crashes into a mountain. However, strong head winds can reduce a helicopter's ground speed to almost zero and, to date, blind flying in a helicopter is an almost unknown art.

Instrument flying in helicopters waits for special helicopter instruments to be developed. If you can't see the ground you have no way of knowing which way you're going—the airspeed meter may indicate zero, while you're proceeding backwards or sideways at a very considerable clip. With no points of ground reference to guide him, a helicopter pilot has very little use for a compass because it will only show him the direction the fuselage is pointing without telling him in which direction he is actually going.

In other words helicopter piloting is full of unsolved questions—which is hardly odd when you consider that Sikorsky flew his VS-300 for the first time on the comparatively recent date of September 14, 1939; that the AAF Helicopter School didn't open for business until June of 1944. No one knows anything about helicopter acrobatics—could you loop it?—and no one has field-tested its theoretical maximum strain points. It's an engineering hypothesis that if an airborne helicopter's rotors are allowed to rotate at too low an rpm the comparative loss of centrifugal force will cause the rotors to fold up like damp feathers and the craft drop like a stone. Conversely, if rpm is allowed to exceed a certain danger point it is a theoretical possibility that centrifugal force would cause the rotor to tear apart—with very unpleasant results.

Which brings us to the AAF Helicopter School's mechanics course. The mechanics school takes about 90 aircraft mechanics per class of nine weeks. The students are mainly overseas returnees who request this training; upon completion of training they will be classified as rotary wing mechanics (SSN 995). They get theoretical and practical instruction in helicopter principles and construction, helicopter inspection and maintenance and such general subjects for about five weeks. Thereafter each man is permitted to take specialized instruction for an additional four weeks in any of several different fields such as rotor assembly, or transmission and powerplant. Many of them contrive to remain on flying status—wearing regular aircrew wings—because it is generally recognized that the problems of helicopter maintenance are so new the mechanic should have the chance of being aboard and actually seeing for himself what's wrong.

At this writing the overseas record of helicopters is already substantial although it was largely established by early field-test models of the 4—the YR-4. Probably the initial combat use of a helicopter was in the spring of 1944 in Burma by the First Air Commando Group which had four YR-4s assigned to it. In April of 1944, a liaison plane was forced down on a Japanese road deep behind enemy lines in Burma; its three occupants were injured and they were miles from a possible landing place.

Another light plane located the party and dropped a message instructing them to burn the plane and climb to the top of a nearby ridge where supplies and food were dropped to them. Shortly thereafter a helicopter rescued the men one by one, ferrying them back to a field where a C-47 could pick them up. After that successful use of the helicopter the process was repeated, the YR-4 flying more than 18 such missions in the next few days. On several occasions

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Master of the Mess

BY CAPT. HARRY H. RANSOM
AIR FORCE *Staff*

Chow hounds may love him or curse him, but the man behind the powdered eggs, dehydrated potatoes, the KP pusher and corned willie is—the mess sergeant

There were times when hot cakes on the griddle kept pace with the bombs falling nearby—and once incendiaries scorched the dessert.

Executive, diplomat, chef — with a touch of pirate and psychologist thrown in—make up the recipe for a successful mess sergeant in the AAF. The spirit of the old "come and get it" on the Western range has cropped out in squadron and group kitchens from Europe to the Pacific. On the other extreme, big-city restaurants are no greater business responsibility than an AAF consolidated mess. And as for what the want-ads call "conditions of work"—well, some mess sergeants have kept meals coming while bombs fell; most of them have developed what the trade calls "moonlight requisitioning" to a fine art.

Some services can be postponed, but eating has to start shortly after any operation, even an invasion. First gaps can be filled by K or C rations; pretty soon, though, regular mess must be established. In the Ryukyus, the AAF chuck wagons started rolling almost immediately, each unit turning out three times a day its stint of 200 meals, including homemade biscuits and all. On D-plus-12, Sgt. Delmar Middleton hung up some kind of special culinary record by producing out of a miscellany of boxes, cans, and bottles the most American thing on Okinawa—lemon pie.

Among the earliest Legion of Merit awards given to enlisted men were those recognizing this kind of ability. More recently, M/Sgt. Waldon G. French received the Bronze Star for his accomplishments—which run all the way from French pastry to training of new KPs.

Sergeant French, with an enviable reputation for producing meals that are good to eat, hasn't always had a quiet job. Just before one mess call, incendiary bullets started landing among his desserts. Moved to shelter, his kitchen continued to turn out meals. Such composure is valuable in a mess sergeant, but no more valuable than French's subtle art of frying dehydrated eggs "sunny side up."

Not all mess sergeants' triumphs have been among the military. Visiting dignitaries such as Congressmen have a way of dropping into a seat at GI tables, and many a mess sergeant has done himself and his squadron proud on such occasions. In Italy, one dinner designed primarily to keep the actress Annabella from getting homesick, has gone down

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Hot food is brought up to flight line in mobile field kitchens.

This is a chow-time scene at a 13th Air Force Pacific island base.

BY CAPT. ERIC FRIEDHEIM
AIR FORCE Overseas Staff

SCANDINAVIAN CARPETBAGGER

An account of the most sought-after and dangerous airline in battle-torn Europe: from Scotland to Sweden, via ATC

Berlin-bound passengers at Bromma Airport near Stockholm were just boarding their JU52 transport when a B-24 sailed down through the early morning fog and rolled to a stop at a far corner of the field. Swedish officials did not seem to pay much attention but the air and press attaches from the German Embassy who happened to be at the airport watched suspiciously. Obviously, this was not another American combat plane making an emergency landing on neutral soil. The Liberator was painted green and there were no identifying markings on its fuselage. The two Nazis also thought it odd that no one stepped from the plane until the JU52 had roared down the runway and headed off in the direction of Germany. And when nine men finally emerged attired in civilian clothes the Germans were convinced this was a case for investigation by the Gestapo.

The date was March 31, 1944, and in neutral Stockholm the arrival of a mysterious airplane could mean many things. In this atmosphere of espionage and intrigue, jittery Nazis were on the alert for any portent of the coming Allied invasion of the West and there was little doubt in their minds that the nine men from the Liberator were linked to events of magnitude.

Enemy suspicion reached fever pitch when one of the civilian passengers was identified as Bernt Balchen, a Norwegian by birth and now a colonel in the American Air Forces. Balchen, the Germans well knew, was one of the world's foremost authorities on Scandinavia and the Arctic. It was Balchen who had been chosen by General Arnold early in the war to establish vitally important outposts in Greenland and along the polar regions so that the AAF could open a new aerial highway to Great Britain. To the Germans, his sudden appearance in Sweden was a matter of great significance.

Nazi undercover agents had no difficulty in trailing the Liberator's crew to a suite at the Grand Hotel in Stockholm. By assiduous surveillance, the Germans learned that Balchen and his men held several meetings with American diplomats and representatives of the Swedish and Norwegian governments. After a week, during which the Gestapo seldom let them out of sight, the Germans deduced generally what was afoot.

Balchen was in Stockholm to evacuate 2,000 Norwegian military trainees from Sweden to Great Britain where they would be absorbed by the great Allied armies that were massing for D-day. He was also canvassing the possibility of repatriating some 1,500 American pilots and crew members who had been interned after making emergency landings in Sweden. Plans for these undertakings had been discussed at the American Embassy in London a month before and Balchen, as an officer of the Air Transport Command, was to establish a secret airline running between the British Isles and Sweden.

General Spaatz already had agreed to turn over a handful of war-weary B-24s and seven bomber crews

who had finished their combat tours with the 8th Air Force. Balchen insisted that the Liberators carry civilian airline markings and that their crews comply with Sweden's commercial air regulations. The Swedes, in turn, promised their AA batteries would not fire on the American planes provided they flew over certain areas reserved for commercial traffic. This would call for exacting navigation since these areas were only 20 miles wide.

For his British terminus, Balchen selected a remote airdrome at Leuchars, near the eastern coast of Scotland. The next problem was to plot the safest route across enemy-occupied Norway.

Allied intelligence knew the Germans had at least 250 night fighters based in southern Norway near Bergen, Stavanger, Oslo, Gossen and Trondheim. The enemy's coastal emplacements were formidable. And it was necessary to assume the Gestapo's intensive sleuthing in Stockholm had given the Nazi defenses ample warning of the impending operations.

Operations got underway in April, 1944, and during this month, Maj. David Schreiner made seven flights between Scotland and Stockholm. First passengers were the Norwegian trainees and Schreiner packed nearly 40 of them into his Liberator on each trip.

"It was anything but a luxury ride for those boys," Schreiner recalled. "I just packed them in like sardines. But nobody complained. They had been waiting for two years to get out."

The Germans, of course, increased their vigilance over Norway and sent up numerous patrols in an effort to intercept the B-24s. On several occasions, British detectors picked up enemy aircraft circling the route but each time the Liberators escaped by taking refuge over the Shetland Islands. The British also provided night fighter escort on some of the runs and during the entire evacuation operation the Germans failed to bag a single American plane.

Word spread to other Allied governments that the Air Transport Command's secret airline was operating into Sweden. Applications for passenger space poured into the American Embassy in London from all parts of Europe. Somehow space was found to fill part of these requests and by the end of June a large assortment of American, British and Russian officials were ferried over the route. Once the airline even transported the entire refugee government of Norway.

One day in July Balchen received an urgent summons from U. S. officials in London. A desperate plea for help had come from the underground in Norway: unless supplies were furnished immediately the resistance movement in that country would collapse.

Officials explained the situation to Balchen. They told him that for the moment not a single plane could be spared to help the Norwegian patriots. They also hoped to drop Allied spies into Norway because our intelligence about German military movements in the area was far from complete. They asked Balchen if his organization would be willing to use its transports for these operations.

Balchen quickly calculated the risks. It was one thing to parachute men and equipment onto the comparatively rolling terrain of France and the Low Countries during hours of darkness. Norway, however, was something else again. Here there were mountains and rough weather and the missions would have to be carried out in daylight. Moreover, Norway was well patrolled by the Luftwaffe and there would be few spots available for forced landings if anything went wrong.

After a brief consultation with Lt. Col. Keith M. Allen, one of his aides, Schreiner and Capt. Robert C. Durham, another of his veteran pilots, Balchen gave his decision.

"We'll do it," he said.

Work started immediately to prepare one of the Liberators for the new job. In the air forces these sorties to aid the underground were known as carpetbagger missions and some modification in the aircraft was necessary. Into the bomb bays went twelve 350-pound containers packed full with machine guns, ammunition, explosives and other material necessary for sabotage. Packages of food and clothing were stowed in the waist. The aperture normally covered by the belly turret, and known as the Joe Hole, would be used to release the packages and any individuals parachuting down to join the underground.

The first mission to supply the Norwegian patriots was flown on July 17, 1944. In the Liberator were Balchen, Schreiner, Durham and other veterans of the secret airline, including 1st Lt. Robert Withrow and Sgts. Albert Sage, William Jesperson, Joel Williamson, Wilford Bollinger and Neil Richards. Briefing for the mission had been exacting. Courses had been planned painstakingly to avoid interception and flak positions. The route selected was believed the safest one possible and if the Liberator remained on course the chance for success was good.

The run from Scotland to the rendezvous point was negotiated with clocklike precision. The Liberator skirted every ground battery and lookout post. The signal was received from the ground party and the supplies fell squarely on the target. Quickly the Liberator circled and pointed its nose for home. The navigator was just giving the plot when Balchen shouted to Schreiner:

"Go north!"

There was a loud chorus of protests.

"Go north!" Balchen insisted.

Reluctantly, Schreiner swung the Liberator about and headed deeper into Norway.

Ten minutes later, Balchen pointed excitedly at a towering mountain peak.

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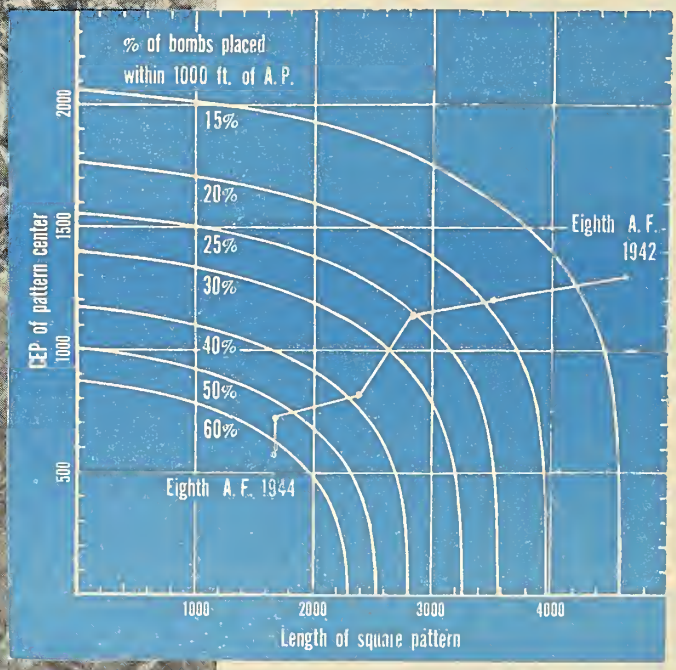
Stockholm's Bromma airport from which Col. Bernt Balchen conducted AAF airline into Great Britain. Photo was taken in 1936.

ASK THEM



On this chart, devised by operations analysts, a unit —group, wing, or air force—may trace its progress in bombing effectiveness. The vertical scale shows the aiming error of the pattern center. The horizontal scale shows pattern size. Curved lines show percentage of bombs placed within 1,000 ft. of the aiming point.

Notice the tremendous development of bombing accuraey in the 8th AF—from less than 15% in 1942 to more than 60 in 1944. Reasons for the improvement are clear: first, a marked decrease in pattern size, then a reduction in aiming errors from 1150 ft. to 850 ft., then another marked decrease in pattern.

Using strike photos, such as one at left taken on a mission over Stuttgart, units can draw up similar charts. Plotting their own position on the curve, they can determine at once where their greatest weaknesses lie—in the size of the bomb pattern or in aiming errors, or both.

BY CHARLOTTE KNIGHT

AIR FORCE Staff

The note lacked even the formality of an inter-office memo; it was written on a buckslip in the General's scrawl: "Can you figure out some means of devising B-29 formations for maximum defensive firepower? Can you do it without subjecting planes and crews to loss in the process?"

It was addressed not to a major general, not even to a major, but to a man in a blue serge suit called "Mister" whose office, like the General's, was in 20th Air Force headquarters in the Pentagon. Ten thousand miles away, across the Pacific, another "mister" was given another problem: "Bombs from our Snoopers are missing too many surface vessels at night due to quick turns by the enemy ships. Can

ANOTHER

AAF commanders pose the questions; it's the job of these civilian combat operations analysts to come up with the right answers

you dope out tactics and aiming procedure to neutralize this evasive action?"

Elsewhere, in every air force in the AAF, a handful of quiet, unassuming men called "mister" and a few called "doctor" are tackling other posers handed to them by the commanders for whom they work, problems that run the combat gamut from strategic bombing accuracy and enemy fighter tactics to precipitation static and effects of various bomb fuze combinations.

Officially these civilians are designated as "operations analysts." The fighting men with whom they work know them better as "Quiz Kids," "Op Annies," or "Doc." Actually they are groups of hand-picked men representing a wide variety of specialized fields—science, mathematics, law, economics, education, and many others. They are assigned to an air force only if requested by its commanding general. When they report to him they sever all ties with their laboratories, universities and industrial concerns. They are on his staff for one purpose only: to help him answer his $64 questions.

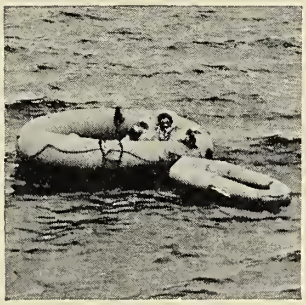
Collectively these answers add up to some of the most important contributions of the war. The analysts' practical, precise studies on flak defense, bombing methods, assessment of target damage, accidents, radar and communications have not only been instrumental in making the AAF a more effective fighting machine but have saved countless lives in the process.

This is the third year of their operation, yet the analysts work so unobtrusively they are still among the least known men in the air forces. One reason is that they take their purely advisory status very seriously. Another is that the matters they deal with are invariably "hot" security-wise. Only now can some of their European achievements be mentioned; their Pacific activities are still classified.

General of the Army Arnold early saw the possibilities of this novel use of brain-power. In 1942 he sent to all air force commanders a message saying, "This may be valuable. Can you use it?" Coincidentally in England Lt. Gen. Ira C. Eaker, then CG of the 8th Bomber Command, had conceived the same idea. "I want a group of civilians as able as my best officers," he said. "I want them free of all operational and administrative duties so that they can go out and investigate a problem and sit down and study it for three days or three months or longer, until they come up with the answer." On the Air Staff the project caught the imagination of Brig. Gen. Byron E. Gates who gave it a home and administrative backing in his Office of Management Control.

Spokesman for operations analysis is Col. W. B. Leach, chief of the Operations Analysis Division at Headquarters. On leave from his chair as professor at Harvard Law School, Colonel Leach considers himself a civilian-analyst-in-uniform. "It is obvious that the top minds of the AAF could solve any problems we've been handed better than any of us civilian outsiders," he says. "The great difficulty is that these officers are so inevitably absorbed with carrying out today's mission and planning tomorrow's they simply don't have the time and uninterrupted attention which most of these matters require. And that's where the Operations Analysis Sections come in."

One of their biggest assignments grew out of a query tossed to them by the commanding general of the 8th Air Force: "What can I do to get twice as many bombs on the target?" The analysts knew the general *didn't* mean the one about sending out twice as many planes, so they had to concentrate on the alternative: increase the bombing accuracy by 100 percent.



Improved rescue methods are among 40 or more different subjects occupying attention of civilian operations analysts assigned to AAF.

They took off their coats and went to work. On the basis of strike photos taken automatically at the time of bomb-release, the analysts plotted bomb patterns after every mission, and drew charts showing the size of pattern and error of pattern center. Weaknesses in the current system began to show up in black and white. For one thing it became obvious that, contrary to expectations, very large numbers of planes — "saturation raids"—placed a smaller percentage of bombs on the target than smaller numbers; for another, that the spread of the bomb pattern on the ground had to be reduced.

Recommendations for improvement were debated with group commanders and submitted to the CG. The bomb pattern was squeezed down by reducing the size of the combat box and directing a single sighting for range for the whole formation. Salvo release or minimum intervalometer settings further restricted bomb dispersion. After these and several other modifications in both training and flying were put into effect, the charts began to tell a different story: finally even the 100-percent increase goal was left far behind.

Laborious and exact strike-photo analyses by all operations analysis sections have tended to make them the scorekeepers on effectiveness of combat wings, groups and even lead crews. The squawks have been many, but the loudest voice can't argue with the pictures-don't-lie evidence. In the 9th Air Force, Chief Analyst Lauriston S. Taylor installed a system of mission critiques extending to all phases of an operation. These hand an orchid to success and put the finger on failure; but, more important still, they show how the high performer got that way and what the low performer can do about it. Some remarkable reversals of form can be traced to the OAS combat clinics.

Bombing accuracy studies constituted but one phase of the work assigned to the OAS of the 8th under the successive guidance of Col. John M. Harlan and Lt. Col. Leslie H. Arps. As the danger of flak became a greater threat than the GAF in the final year of the air war against Germany, the analysts' attention shifted to anti-flak tactics. Among other counter-measures, they recommended a formation of squadrons stacked in altitude, designed to present multiple targets to each AA battery and reduce the total

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The Sting of the Scorpion

BY CAPT. L. P. BACHMANN
AIR FORCE Overseas Staff

ILLUSTRATED BY SGT. LOUIS S. GLANZMAN

Paradoxically, it was a shortage of fuel that gave the "Yellow Scorpions," a 14th Air Force P-51 squadron, their opportunity to build up a distinguished record of offensive action against the Japs in northern China.

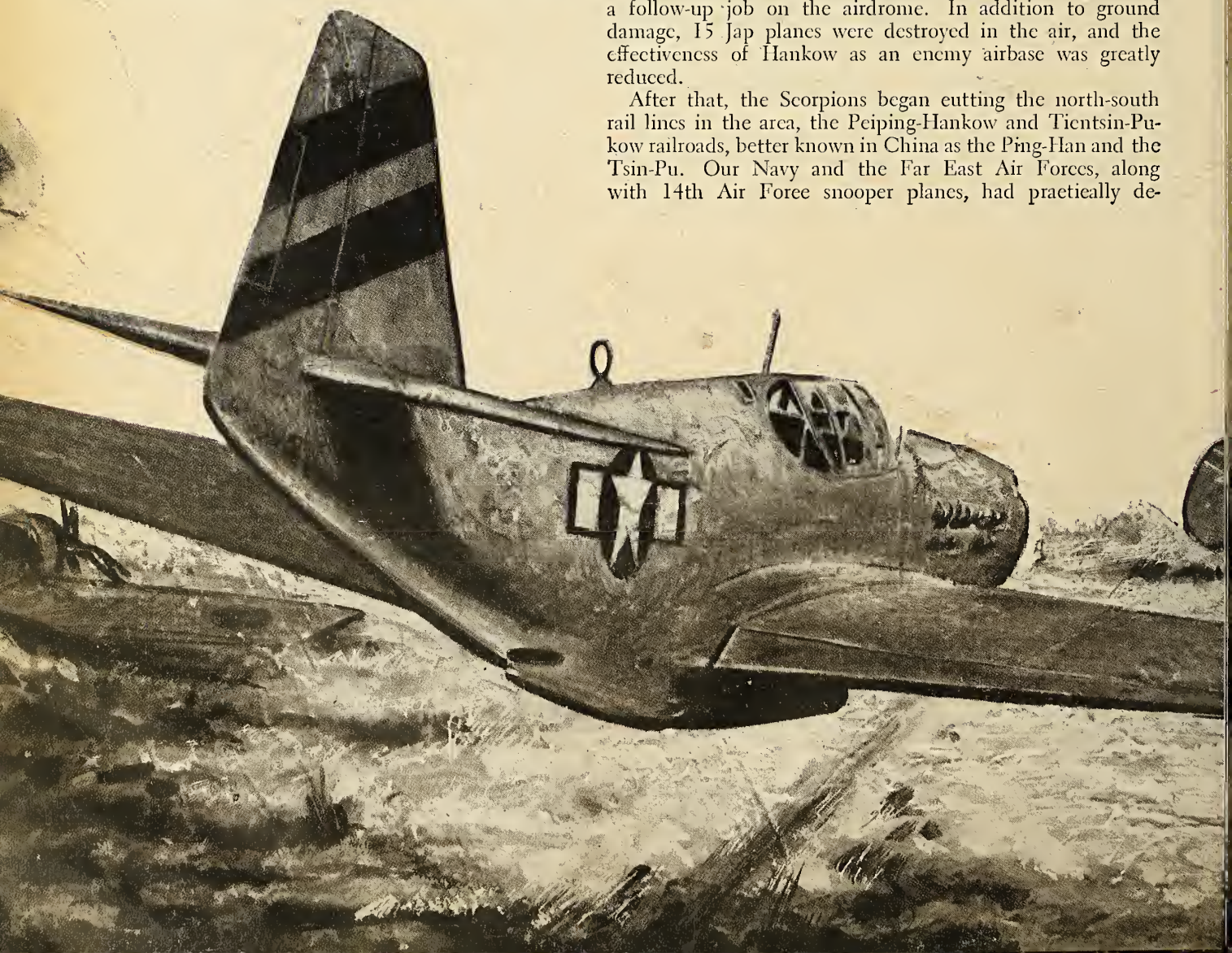
When the time came for the 14th to go on the offensive in northern China, there was only enough gasoline available for one squadron of the fighter wing known as Randall's Raiders to go into action. The Yellow Scorpions drew the coveted assignment while other squadrons marked time.

Another distinction held by the Yellow Scorpions is that they are probably the only squadron that was given its name by the Japanese. That story goes back to the unit's early days, in the middle of 1944, when their fighters were flying in Assam and Burma, providing cover for 10th Air Force B-24s in attacks on Rangoon and Mandalay. As a protection from our own gunners to whom the Mustang was new, they painted their prop spinners yellow.

When, at the start of the monsoon season, the squadron moved to an advanced base in north China, the Japs missed them around Burma. Radio Tokyo's explanation was that these "yellow scorpions" had been wiped out. Major J. J. England, squadron commanding officer, and his men liked the name, adopted it, and started to contradict the Jap radio report from their China bases.

On December 18, 1944, at Hankow, the squadron joined with B-29s, B-24s and B-25s in what was the heaviest air attack in China up to that time. The Superforts, uneseorted, hit the dock area with full loads of bombs; then the B-24s and B-25s, with escort, blanketed the airdrome. Fifteen minutes later, the Scorpions, this time accompanied by other squadrons of their group, came in on the deck for a follow-up job on the airdrome. In addition to ground damage, 15 Jap planes were destroyed in the air, and the effectiveness of Hankow as an enemy airbase was greatly reduced.

After that, the Scorpions began cutting the north-south rail lines in the area, the Peiping-Hankow and Tientsin-Pukow railroads, better known in China as the Ping-Han and the Tsin-Pu. Our Navy and the Far East Air Forces, along with 14th Air Force snooper planes, had practically de-



stroyed all coastal shipping, and the Japanese had to use the rails to move men and supplies from north China to positions on the coast where they expect a landing by U. S. forces. After dropping bombs on a bridge, a flight of the Scorpions would then look for targets of opportunity, hoping to combine two tactical functions—isolation of the battlefield and knocking out the enemy's air strength. Since they carried bombs in place of wing tanks, lack of fuel usually stopped the sweeps about 40 miles short of Tsinan, an important and heavily-defended rail junction.

On December 22nd, the pilots, flying at considerable altitude, noticed a great many planes parked on the airfield at Tsinan. Lack of gas forced them to return to base, but two days later the Mustangs, carrying wing tanks, took off for Tsinan. The field was loaded with planes, and the Scorpions went back and forth, low over the field, for half an hour. They left 39 Jap planes burning. One plane blew up underneath Capt. John H. Honeycutt, and he returned to his base with a big chunk of Japanese aluminum in his wing. The day after Christmas, the squadron went back to Tsinan and got 29 more Japs. They went again on January 3, and got 13 more, through ground fire which was so intense that 90 percent of the Scorpions' planes had holes in them when they landed.

They were coming home from that last raid when they were jumped by 12 Oscars and a Tojo. "We were like the guy who has a better class of dreams: we could look but we couldn't touch," Capt. Warren Field, operations officer, said. "All but two of us were out of ammo. Lt. LeRoy D. Fahey was lucky. He had a burst left and got a probable. The whole thing developed into the damndest dog fight I ever saw. It was certainly the biggest camera gunnery practice ever held in China. We made passes at the Japs and got some wonderful pictures. They must have thought we were nuts. The whole mixup broke off after 10 minutes. We went home with nothing hurt except our feelings."

They learned a few days later that the Japanese major general in charge of that area had committed hari-kari because the Scorpion's missions had cost him a lot of face. "The P-51 is a very versatile plane," Captain Field said. "If it doesn't get the Japs one way it gets them another."

They kept right on doing this kind of work, dropping bombs on railroad yards and bridges, working over airfields, knocking Japs down in the air. The two fields at Peiping were loaded with transports, and the Scorpions beat them up. "It was like being in a shooting gallery with a shotgun instead of a .22," Captain Field said. The Japanese got so they drained the gas out of their planes on the ground. Although they couldn't take off after the Scorpions, there was the disappointment that they didn't burn easily either.

Then in February the Scorpions made their last big airfield sweep. There were only a few Japanese planes left in the area, not enough to be worth the gasoline it would take to wipe them out, and the Scorpions stuck to beating up rail lines. Finally in the middle of February, they were called back from their advanced base, and were replaced with another squadron from their group which wanted in on the fun. The Scorpions were assigned the defense of some B-29 fields, and managed to get more Japanese in the air. Occasionally they got an offensive job in, like going over to Nanking, challenging the Japs merely by being there, and then whipping them.

All during their busiest operations, more than 90 percent of the squadron's planes were always in commission. The crew chiefs did an outstanding job. Out in China, they don't worry much about first, second, third and fourth echelons of repair. "We can't pay any attention to what echelon a repair job is," M/Sgt. Dean A. Bushee, the Scorpion line chief, said. "We know we got to fix the planes. If we can't get one in shape, it goes to the junk heap.

"We've always got a stock pile even though we're out at the end of the supply line. It's very simple. We use one plane as a sub-depot. If a Mustang is laid up for major repairs, it immediately becomes available for spare parts for the other planes with troubles. When the ordered parts arrive, the cannibalized job gets everything that's been stripped from it. Of course, it's very rough on the crew chief whose plane is 'it.' Maybe that accounts for the fact that every guy works hard keeping his plane in order." ☆

When the Japs named its P-51s "Yellow Scorpions," this Mustang squadron struck out to earn the title

PARTNERS IN BATTLE

(Continued from Page 6)

with or without air help provided the German defenses did not change materially. The Ninth Army did not participate in the St. Lo offensive but reports show in this instance that the opposing forces were of such strength that it is possible a successful break-through could not have been accomplished without air cooperation.

Generally, I have found it ideal to have continuous air cover for each attacking column of the army. It is especially desirable to provide continuous column cover for each attacking combat command of the armored divisions. During the battle of France this condition generally prevailed because there were fewer armored divisions in the offensive than in the final stages of the war.

Tactical air reconnaissance has been valuable in supplying information of the enemy not available by other means, thus maintaining a check on all types of enemy movement within a distance of 30 to 40 miles from our front lines. The pilots of these airplanes, because of their specialized training, were frequently able to locate suitable fighter-bomber targets and lead the P-47s in for the attack. Sufficient aircraft for tactical air reconnaissance have been available and efforts have been made to locate airfields as close as possible to the enemy area. It is quite important that this be done in order that the weather conditions will be the same at the airport as in the enemy zone of interest.

At times, such as in a rapidly moving situation, it is difficult to disseminate the visually obtained information through normal channels and it is necessary to utilize all forms of communications including direct radio contact between the planes and the corps and divisions.

Inasmuch as the adjustment of heavy and super-heavy artillery by high performance aircraft (the P-51 Mustang) has become essential and practical it is believed that a new type of plane should be developed for this purpose possessing better visibility and providing for a two-man crew, thus permitting an artillery trained officer to conduct enemy installation searches and fire missions.

A material increase in our night photo reconnaissance operations would be an important factor in increasing the effectiveness of air and ground operations inasmuch as information obtained from enemy civilians and high-ranking German officers revealed that major troop and supply movements of the German army were made at night unless absolute military necessity required daylight movement. For instance, by utilizing night movement, the 116th Panzer Division was able to move from Dorsten to the Ruhr pocket unobserved by the air force. In order properly to be informed as to the enemy's intentions it is believed essential to have both night photo and visual reconnaissance on major road junctions, marshalling yards, canals, rivers, key cities, and other points through which troops may pass or assemble. In future campaigns, the Army should have available night reconnaissance on the same basis as daylight reconnaissance.

It might also be well for our air forces to initiate research toward the development of a new "tank destroyer" type of aircraft. This plane should mount a weapon lethal to tanks and should possess a degree of accuracy superior to that of the present dive-bomber.

These suggestions are not offered in any spirit of criticism. They simply reflect the measured judgment of battle-wise observers and commanders. I am putting them forward in the hope that before long the already successful teamwork between air and ground will reach a stage well beyond the hopes of its most ardent supporters. ☆

ASK THEM ANOTHER

(Continued from Page 31)

time of bomber exposure to fire. In the face of doubts that this formation could be flown, the 69th Combat Wing tried it on and flew it, both in training and in combat, with the predicted results. Not the least interesting feature of this particular problem is that the OAS report on the subject was prepared by a mercantile expert from a department store, an investment analyst from Wall Street, and a lawyer who had recently been legal assistant to the Chief Justice of the United States.

"The ideal analyst," says Colonel Leach, "is a genius who hasn't forgotten that the answers to hard questions come by hard work and not by looking into a crystal ball. In picking men that's the standard we shoot at. Sometimes we hit it." Four college presidents, leading scientists and mathematicians, and a sprinkling of prominent lawyers are to be found in OAS ranks. The theory is that if you take a very good man and put him in a brand new field like air warfare, he is bound to bring to a problem—no matter how exclusively military it may be—the same keen intellectual insight that made him successful in his civilian occupation.

The results tend to back up this reasoning. The three operations analysts responsible for developing the position-firing technique in flexible gunnery (see AIR FORCE January 1944) had never fired a machine gun in their lives before being handed this problem by Maj. Gen. U. G. Ent, then commanding general of the 9th Bomber Command. As sound director of MGM in Hollywood, probably the closest Douglas Shearer came to bombsights was in the filming of some aerial screen epic, but as chief of an OAS in the Pacific he was responsible for solving a most acute problem concerning a special aiming device.

Albert W. Arneson, civilian operations analyst, killed at Tarakan studying effects of bomb fuze combinations used in bombing Borneo oil fields.

The "Op Annies" are keenly aware of their great deficiency—lack of combat flying. They remedy this by getting out of headquarters and onto the bases, talking with the men and soaking in experience through the pores. Sometimes this isn't enough. Ed Hewitt, a mathematics instructor at Harvard, holds the Air Medal for flying seven missions over Berlin—as a civilian. And Al Arneson, an architect from St. Louis Park, Minn., lies in a grave on the beach at Tarakan where he was killed in action while studying at first hand the effects of our bomb fuze combinations.

Many of the problems presented to the OAS groups are highly local in nature. The Middle East came up with this puzzle: Early in the game air force units in Libya discovered that abrasive dust from airfields was ruining the engines of their bombers. The OAS was asked to take a hand. In a jeep filled with empty whiskey bottles, the analysts started out to collect samples of the brine from each of the salt lagoons just back of the Mediterranean shore. When they analyzed the contents they discovered a high concentration of magnesium chloride brine in some of the lagoons, and after experimenting with it they issued a report recommending the exact procedure by which this brine could be used to stabilize the quartz-sand dust on

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CROSS COUNTRY

News and Views around the World

nfinished Business — Page 38

A Stroll on Luzon

Lt. Russell D. Giesy, P-47 pilot with a 5th Air Force Fighter Command group, found himself with a dead engine in the midst of a ground coordination strike against entrenched Japs in the Balete Pass area of northern Luzon. The fanatical resistance by enemy troops in the pass sector made it just about the worst possible place to ditch an airplane, but Giesy had no choice. His personal account follows:

I tried to stretch my glide toward our lines but I was losing altitude so fast I decided to bail out. A brisk wind began carrying me towards the Japs, despite my pulls on the risers to change direction. As I neared the ground I heard snipers' bullets whizzing past me, but I hit tree tops without stopping any bullets.

The chute hung momentarily, then let me drop about 20 feet to the ground. I was dazed for a moment, then got up and started running. Within a few seconds I came to my senses, however, and took out a miniature compass an intelligence clerk had given me a few days before. After checking this and figuring I was east of Highway 5, the main road, I walked across a ravine and up the other side to a wooded ridge. I decided to keep on the ridge, rather than risk being spotted directly on the road.

About this time things started happening. I ran across some enemy foxholes and, as I started down the side of the ridge, I spotted a lone Jap standing nearby. I heard Jap voices behind me. As I started back around the ridge, an artillery barrage cut loose showering shrapnel all over the place. After several moments of indecision, I ran down an incline and smack into a Jap camp which, fortunately, proved to be deserted for the time being. I saw a pistol and belt lying on one equipment pile, and since I had no pistol with me, I was tempted to stop for it, but decided to keep running.

I crawled up the next ridge and found two unmanned Jap machine gun positions directly in front of me, one about 50 feet away and the other some 100 yards farther along. By now, I was so exhausted I rolled about 20 feet into the brush to wait and rest.

Soon two Japs came running up the same trail I had used and stopped within a few feet of my hiding place. One of them went over to the nearest machine gun, but the other stood near me for an hour and a half. I spent the entire time praying. Finally, he moved a little farther away and I decided to take a chance on clearing out. As I got up I saw the other Jap leave the machine gun and head in my direction. Turning quickly and hoping he would think I was his companion, I started walking down the trail.

The ruse worked and he came walking along behind me. Although he was armed with a rifle, I decided to slow down to allow him to catch up with me. I led him to the edge of a cliff, and when he was almost by my side, I wheeled and slugged him in the face with all my strength. He tumbled, screaming, down the cliff.

I turned and ran along the eastern side of the ridge. In my hurry I stumbled into a trench, and looked up to see a very surprised Jap officer two feet away on my right. He wore heavy horn-rimmed glasses and was holding a pair of binoculars. He reached for his pistol, and I struck him as hard a backhand blow as I could manage in my off-balance position. I felt his glasses crunch and he fell over backwards. I dove over the top of the trench and rolled down a steep incline.

Walk-away landing.

At the bottom of the hill I found a creek with about two feet of water. Several times I tried to crawl up the bank to gain the main road, which I could see at times, but I was too exhausted to make the grade. At last I came to a point where the creek bank leveled off and I climbed out to the road.

I had been walking in the center of the highway for some time when I came to a sharp bend. As I rounded the curve, one coldly spoken word broke the stillness of the dark, which had come about an hour before. That word — "Halt!" — made me the happiest I have ever been. I had reached an infantry outpost.

I asked the men why they hadn't shot me when I came stumbling down the road in the dark, and they said they knew I had bailed out and were hoping and praying that I would make it back alive.

The boys found a jeep and rushed me back to the regimental first aid station where I was "wined and dined" and patched up. All in all, I couldn't have received more kind and gentle attention if I had been a newborn babe.

Memorial

One of the first memorials erected by the French in tribute to Americans who died on the soil of France was recently dedicated near St. Cyr de Valorge. Residents of two villages, St. Cyr and Tarare, joined in constructing the monument on a hillside where five American airmen died in a B-24 crash while carrying supplies to resistance forces. They were members of the 492nd Bomb Group of the 8th Air Force. A memorial mass for the dead airmen was held at the village church, followed by ceremonies at the flowerbanked monument.

Plane Luck

This American fighter pilot, shown in an accompanying photograph, walked away from his plane, uninjured, after it had crashed on Mindoro Island in the Philippines. The plane spun down in flames after receiving a burst of fire from a Jap Zero.

Locomotives by Air

Railroad locomotives were needed by Allied ground troops to establish supply routes in forward territory captured from the Japanese. Because of the mountainous territory and lack of good roads between India and Burma, the only way to get switch engines to the points where they were needed was to transport them by air.

Six American-made engines were dismantled and crated at a civilian railroad shop in Calcutta. The heavy parts of the locomotives, some weighing as much as 1,700 pounds, were hauled to a nearby airport and loaded into an AAF C-87 transport plane. The destination was a front line flight-strip which lacked 2,000 feet of the length normally required for four-engine transports.

Everything was against the landing being made with safety, yet the C-87 was brought in without mishap by Lt. Col. Payne Jennings and Lt. Frank L. Gurney of the Eastern Air Command. The heavy locomotives were unloaded by hand by Indian troops,

with the aid of local Burmese. The parts were carried bodily to the nearest railhead and put together again.

The acute shortage of locomotives in Burma had been caused by pilots under Maj. Gen. George E. Stratemeyer's Eastern Air Command in their drive against Jap supply routes. They smashed so many formerly used by the enemy that it was necessary to bring in engines to take over the lines and keep Allied supplies rolling.

Prevent Burns

Air Forces Manual No. 48 does not contain many words, but the pictures carry a powerful wallop for airmen who are careless in protecting themselves from fire.

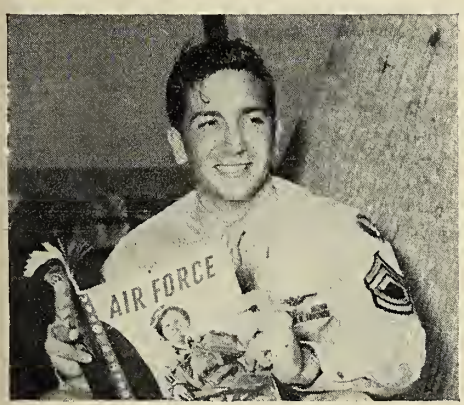
Designed to counteract fire negligence, this new manual explains its purpose by stating that almost 90 percent of all aircraft burns are on head, face, hands and arms because these parts usually are not covered. A good look at some of the medical photographs in the booklet should cause any flying man to take precautions.

The publication was produced at Headquarters by AC/AS Training, Training Aids Division, and the Office of the Air Surgeon. Routine distribution has been made, but additional limited quantities are available upon request through channels to Training Aids Division, One Park Avenue, New York 16, N. Y.

Man Alive

Back from Death's door—literally—came T/Sgt. George L. Moscovis of Opelousas, La., now a patient at AAF Regional and Convalescent Hospital, Miami District.

It's a strange story the husky young 12th Air Force B-26 engineer-gunner tells, but official records prove that it's true.



Alive, but not kicking.

Moscovis took a 1,000-foot free fall when he bailed out of his burning, stricken bomber during a mission to Southern France. His parachute did not open, and trees or brush broke his fall, saving him from death.

He was found by German soldiers who thought he was dead and stripped his body of all identification and valuables. French Maquis later found him and also thought him lifeless. A French doctor pronounced him dead.

In a deep coma for four hours, Moscovis

QUESTIONS
on Policy and Procedure

Q. May an individual be assessed a money penalty for minor derelictions and omissions without resort to trial by court-martial or action under AW 104?
A. *The assessment of money penalties of any nature whatsoever against military personnel without resort to court-martial, to action under AW 104, or to other prescribed procedures set out in Army regulations is unauthorized. The funds constituted of such illegal fines and forfeitures likewise are without authorization. (Fines under AW 104 may be assessed only by a Brigadier General or higher upon a captain or lower, and then only a maximum of one half of one month's pay.) (AAF Ltr 35-200, 30 March 1945)*

Q. Who is authorized to wear flying instructors wings?
A. *Flying instructors on duty with the AAF during such time as they are assigned to this duty, except that individuals who have satisfactorily performed a total of six months duty as flying instructors since 8 September 1939 are authorized to wear the insignia permanently. A flying instructor is defined as an officer, warrant officer, flight officer, or enlisted man, on flying status whose assignment and principal duty is actually instructing students during aerial flight in the duties of a member of an aircrew, or whose assignment and principal duty is supervising or checking the progress during aerial flight of students undergoing such instruction. (AAF Reg. 35-6 dated 26 August 1943)*

Q. May personnel who are assigned or on TD with an organization wear the Distinguished Unit Badge authorized for the unit to which they are attached or assigned?
A. *Yes. Individuals who were assigned or attached to the unit on the occasion for which the citation was awarded are entitled to wear the badge as a permanent part of the uniform. Persons who are subsequently assigned or attached to a unit which has earned the citation are entitled to wear the badge as a temporary part of the uniform so long as they remain with the unit. (Cir. 333, WD, 1943)*

Q. How is a new tobacco ration card for use in the continental United States obtained when the original is lost?
A. *The individual must obtain a certificate from his superior officer, stating the applicant for a new card is eligible because the card initially issued has been lost and a diligent effort has been made to find it. The certificate will be submitted with the application. A certificate must also be obtained if an individual did not apply for a card during the initial issue period. This is not true of new inductees and returnees. (Cir. 135, WD, 1945)*

Q. What clearances are required of an officer or warrant officer before departure from a post upon change of station?
A. *He will arrange for a clearance from each agency on the post from which clearance is required, in accordance with existing (post) instructions (AAF Manual 5-1, 15 April 1944). These instructions will vary at different stations. Such clearances are for the protection of both the post and the individual. Also note par 1b (1), AR 605-120, which states that "an officer departing from any post, camp, or station, under circumstances which involve a change of status, will report in person to his next superior commanding officer having administrative functions at that place, at the office of such commander, within 24 hours of departure, and will furnish him with the data necessary for notation on the morning report, and a copy of his authority for departure, if required."*

Q. Does the fact that an enlisted man's Service Record is not available constitute a justifiable reason for his non-payment?
A. *No. An affidavit may be obtained from the enlisted person to prepare a temporary Service Record as authorized in AR 345-155, and Sec XXXIV, TM 12-230.*

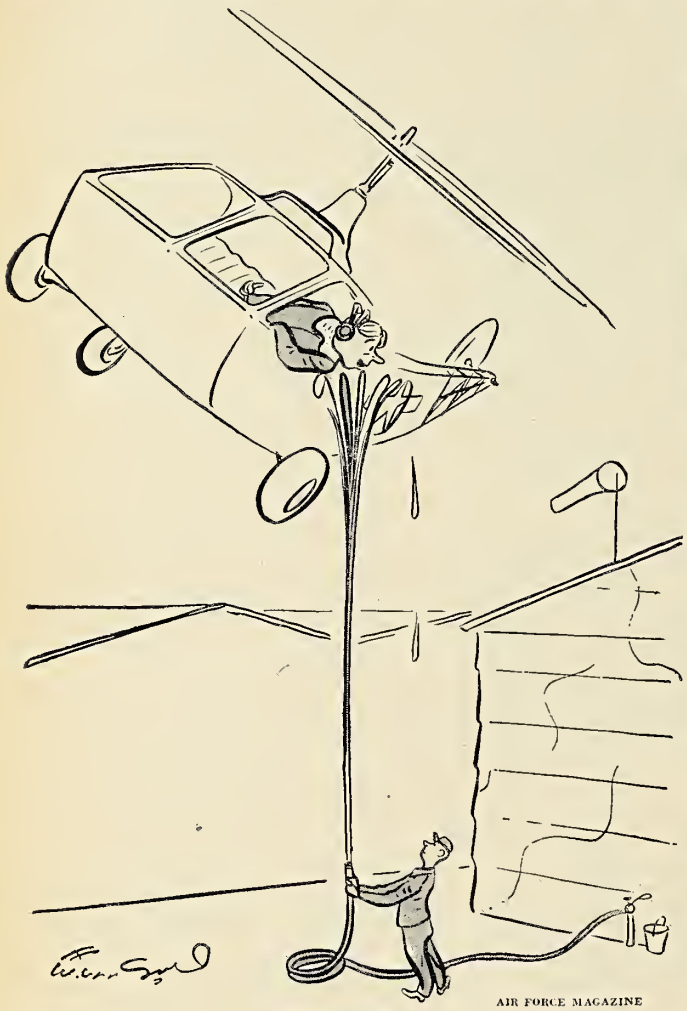
Q. Do AUS and Reserve Officers get credit for leave which would accrue during their terminal leave?
A. *Yes. For example, if an officer being relieved from active duty under honorable conditions has two months (60 days) leave to his credit, he may be given 65 days terminal leave. An officer accrues 2½ days leave per month while on active duty. He is considered to be on active duty while on leave, and therefore would accrue an additional 5 days on the 60 days of accrued leave. (AR 605-115, as amended)*

PREPARED BY THE OFFICE OF THE AIR INSPECTOR

regained consciousness just in the nick of time. His eyes flicked open just as the Frenchmen were lowering his body from a table into a coffin, preparatory to burial. A weak grin split his tanned features.

"They started to kiss me," he recalls, "then they all began to cry. Then damned if I didn't start to cry, too."

A few days later, the French wrested control of the town from the Germans and



"Thanks!" AIR FORCE MAGAZINE

turned Moscovis over to Allied hospital authorities where he was examined and given treatment.

An act of heroism performed by Moscovis before he left the burning, stricken bomber also won him the Distinguished Flying Cross. Seeing a crewmate pinioned under equipment, Moscovis tore him free, got him into his parachute, helped the dazed gunner to the escape hatch. Part of the way out, the gunner's foot again became caught. Moscovis again freed him, shoved him out, then went out himself.

A Perfect Day

A heavy rain poured down on New York City. At LaGuardia Field, ceiling and visibility were both zero. A thick fog shrouded the field and a strong wind ripped across the bay.

Maj. John W. Adams walked into the office of Lt. Col. E. A. Cutrell, Navigational and Landing Aids Unit, Air Transport Command. "Well," he asked, "how do you like the weather?"

"Beautiful," Cutrell replied as he watched Adams remove his raincoat.

"All fields from here to Presque Isle, Me., are closed in," Adams reported.

"Excellent," the Colonel answered. "Perfect."

"All military and commercial flights have been cancelled," Adams continued.

"This is the weather for us." Cutrell said. "Let's go."

Within an hour, Adams had taken off for Presque Isle in a C-47. Shortly after, Cutrell got into his C-47 and made 17 landing approaches at fields in the New York area.

The two flyers were not trying to end it all. They were taking part in ATC's experiments in all-weather flying, attempting to determine the equipment and procedures necessary to conduct all military and commercial schedules on a year-round all-weather basis.

Major Adams flew up to Presque Isle without incident, but when he neared the field he discovered that he had to let down through 4,000 feet of icing in three-quarters of a mile visibility. He followed the prescribed procedure, using a system of radio beacons and special navigational aids, and landed without difficulty.

Back in New York, Cutrell made approaches at three different fields, and, although he was unable to determine the exact location of the runways, he could have made an emergency landing through the weather if it had been necessary. Rather than take any chance on an unnecessary accident however, he flew to Washington and made a contact landing.

ATC's Navigational and Landing Aids Unit was established at LaGuardia in July, 1944. Its purpose is to fly all-weather conditions in the New York area and the northeast airway between New York and Maine when other flying, both military and commercial, is cancelled. This was successfully accomplished on all but two days, and those postponements were the result of snowdrifts which made take-offs impossible. During a bad season of weather, from February 10, 1945 to March 12, 1945, a daily schedule was maintained between New York and Maine without cancellation.

Experiments are being conducted on a regular basis with various types and combinations of navigational aids and ground equipment. The expected results are summed up by Colonel Cutrell who says, "The day is not far off when most military operations will be conducted on an all-weather year-round basis."

Room Service

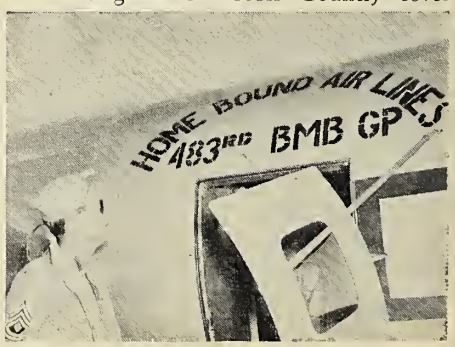
Maj. Beryl M. Simpson makes field IG inspections for the AAF, being assigned to an inspecting team which covers the India-Burma theater. The male member of the major's team is the Inspector General, himself, and she is the administrative specialist. During such trips throughout the theater Major Simpson runs up against some rather basic problems. Simply stated, there are stations and outposts which have no facilities for a lady's comfort. But somehow or other the endless ingenuity of the USAAF always manages to arrange for the Major to have some semblance of comfort, wherever night finds her.

Recently a visit was scheduled to an air emergency rescue squadron. When this information grapevined to the men in the lonely outpost, they sent frantic wires that they had no place to keep a Wac. Headquarters got worried, but Major Simpson did not. She packed a pup tent and started off into the back country. Meanwhile the frantic squadron began looking around for a place for her to sleep. After a time they located the palace of a Maharani. When Major Simpson went to bed that night she had a wide choice. The palace attendants offered to show her each of the 300 rooms.

Home Bound Airlines

Pilots and combat crews of the 15th Air Force make no secret of their new destination, Tokyo, via U. S. A., but their heavies will be mediums when they begin shaking the suki yaki out of the Japs. Converted B-17s were used to bring infantrymen to Casablanca, thence to the States. Airmen leaving the mud, dust and cold of sunny Italy have jokingly decided that whatever living conditions they find in the Pacific will be a vast improvement.

The sergeant on Cross Country cover



It's going his way.

takes a long term view of his next job, judging by his supply of overseas stripes he has available for the next theater of operations. He, too, makes no secret of his ultimate destination.

The Wall Came Down

In days of old when knights were bold, but without supporting aircraft—the storming and scaling of castle walls was a difficult and costly task. In this war, however, when the AAF was faced with a modern counterpart of the battle of Jericho, it replaced Joshua's trumpet with a somewhat more efficient method of attack—2,000-pound bombs released from low flying B-25s. The results were the same: the walls came tumbling down.

The locale of the modern Jericho was in Burma where ground troops of the British and Indian 14th Army Forces surrounded Fort Dufferin in Mandalay and were faced with the problem of attacking a strongly defended fort which was protected by towering walls and a wide moat. The 12th Bombardment Group of the Eastern Air Command—known as "the Earthquakers"—was called upon to destroy the north wall of the fort.

Four B-25s started the attack by dropping three 2,000-pounders right on or directly against the 400-year old wall from an altitude of 200 feet. A full squadron of Mitchells followed with a release from 6,000 feet, and the job was ended a few hours later when 35 B-25s assaulted the entire northern area of the fort, dislodged the Japanese emplacements that commanded the approaches, and effectively eliminated a deadly crossfire which had prevented previous ground efforts to cross the moat. The fort was occupied less than 13 hours after the bombing started.

Crewmen of the 12th called upon Kipling for their comments concerning the battle. Lt. Richard M. Clark, pilot, said, "Flying bombs replaced Kipling's flying fishes over Mandalay, and the Japs saw plenty of them." And S/Sgt. Walter C. Smith, combat photographer, added, "I've been wanting to see Mandalay for a long time, ever since I read that poem, and today I got a good look."

The fall of Mandalay, second city of Burma, was another milestone for the 12th Group in helping to chase the Japs out of southeastern Asia.

Postwar AAF Officers

The AAF has initiated a second evaluation survey covering every officer in the AAF to provide information for use in selecting officers for the postwar AAF. For this purpose, revised Officer Evaluation Report blanks, AAF Form 123, have been distributed to all AAF activities by the Office of the Assistant Chief of Air Staff, Personnel.

Useful information has been provided by the first evaluation, recently completed. The second survey has been undertaken to bring previous information up to date, to obtain reports on officers omitted in the

PLANE BONERS

Analyzed by Veteran Pilots

CASPER, WYO.—Having feathered his No. 4 propeller when oil pressure dropped at 10,000 feet, the pilot of a B-24J needed more power when he made his final approach for a three-engine landing. He advanced throttles, but only the No. 1 and No. 2 engines responded. Veering to the right, the plane crashed short of the runway. No one was injured but the Liberator was damaged badly.

Comment: Althaugh from 10,000 feet the pilot had plenty of time to check and recheck his cockpit pracedure, investigation disclosed he still had made the error of placing No. 3 engine instead of No. 4 in idle cutoff. Thus, what should have been a fairly routine three-engine landing became, instead, a crack-up.

FORT SUMNER, N. M.—Although warned by the tower that an accident had occurred on the runway, the pilot of a P-40N, who had just landed, continued to taxi without essing. Suddenly he saw the crash directly ahead of him and applied his brakes so abruptly that the plane nosed up. The engine, propeller, spinner and bathtub were damaged badly.

Camment: Taxiing accidents always are inexcusable. Even under ordinary conditians, a single-engine fighter pilot should ess his plane in arder to observe what's ahead af him and the pilat in questian was daubly negligent in view af the fact that he had been warned of trouble an runway.

DALLAS, TEXAS—Go-around was made in an A-26 because of traffic congestion. On final approach landing gear warning light was green and hydraulic pressure OK. On touching runway the nose gear collapsed. Pilot stated that he lowered gear at approximately 200 mph.

Comment: Relying anly on the warning light isn't safe pracedure. Check light, gear indicator and hydraulic pressure gage. Cap these precautians with a visual check of nose gear through cockpit floar window. Wheels an A-26 main landing gear extend against and retract with the slipstream. Strict abservance of airspeed limitatians must therefore be fallowed in lowering gear. Number ane rule is: Do not operate landing gear until airspeed is 160 mph or less. Your nose wheel may not extend at higher speeds and you may cause damage by attempting it.

LAUREL, MISS.—Flying a navigation mission in an A-26, the pilot was instructing the gunner in map reading and use of the E6B computer while at an altitude of 300 feet. Looking up he saw a tree—but not in time to miss it.

Comment: An airplane at 300 feet is a poor place to hold ground schaal.

8TH AIR FORCE—Crosswind landing was attempted by P-51 pilot. The P-51 fell off on the left wing and swerved off the runway, demolishing two parked gliders.

Comment: A successful crosswind landing isn't difficult if pracedure recommended in Pilots' P-51 Training Manual is used:

1. Drop the wing into the wind slightly to counteract drift.

2. Just before tauching runway, level your wings.

3. Make a wheel landing if the crasswind is excessive, gusty or otherwise daubtful.

4. Use less flaps far any appreciable crasswind.

BIRMINGHAM, ALA.—Flying a C-47 ferry mission on CFR, the pilot requested an instrument clearance when he ran into bad weather. IFR clearance was granted and the plane continued on its flight. The C-47 encountered extreme turbulence. Several passengers, not using safety belts, were tossing about the rear of the cargo plane. A Wac passenger struck her head on a bucket seat, suffering a brain concussion.

Camment: When he changed ta IFR the pilot didn't order all passengers to fasten their safety belts. Pratect your crew, passengers, and yourself by insisting an all safety precautions. You are the airplane commander and respansible for all occupants.

APO 493—Bringing back a B-29 from a routine bombing and gunnery training mission, the pilot was giving his copilot instruction in flying and landing technique. Sitting in the copilot's position, the pilot lowered the landing gear. At the end of the landing roll the acting pilot started to turn off the runway, asking for flaps up. The pilot, acting as copilot, pushed a button. The landing gear came up and the Superfort settled on the ground.

Comment: Flaps don't work off the landing gear switch.

HOBBS, N. M.—Pilot in a B-17F, light because all turrets, guns and armor plate had been removed, ran up inboard engines to check magnetos. The combination of running engines and a tailwind brought the tail up far enough for two props to strike the ground.

Comment: Turn your plane inta the wind for sure safety on an engine run-up.

PREPARED BY THE OFFICE OF FLYING SAFETY

NEW BOOKS

WAR

MISSION BEYOND DARKNESS. *Joseph Bryan* and *Philip Reed*. The story of the carrier Lexington's Air Group 16 during first Battle of Philippines. DUELL, SLOAN & PEARCE, N. Y., 1945.

THE SUPERFORTRESS IS BORN: THE STORY OF THE BOEING B-29. *Thomas Collison*. An illustrated account of the design, engineering, production and operation in combat of the Superfortress, by its civilian coordinator. DUELL, SLOAN & PEARCE, N. Y., 1945.

HISTORICAL

THE MILITARY STAFF: ITS HISTORY AND DEVELOPMENT. *James D. Hittle*. Staff organizations and functions of modern armies, with their historical backgrounds. MILITARY SERVICE, HARRISBURG, PA., 1944.

POST-WAR

A GUIDE TO THE EVALUATION OF EDUCATIONAL EXPERIENCES IN THE ARMED SERVICES. *American Council on Education*. The outgrowth of recent studies on the relation of service educational experiences to civilian educational institutions in veteran readjustment. AMERICAN COUNCIL ON EDUCATION, WASHINGTON, 1944-1945.

TECHNICAL

AIRCRAFT VIBRATION AND FLUTTER. *C. R. Freberg* and *E. N. Kemler*. Fundamentals and general phases of the subject. WILEY, N. Y., 1944.

PRINCIPLES OF FIREARMS. *Charles E. Ballcisen*. Engineering fundamentals for analysis, design and construction of modern firearms. WILEY, N. Y., 1945.

VIBRATION ANALYSIS. *N. O. Myklestad*. Methods for solving vibration problems, particularly in airplanes. MC GRAW-HILL, N. Y., 1944.

YEARBOOKS AND HANDBOOKS

AIRCRAFT ENGINES OF THE WORLD, 1945. *P. H. Wilkinson*. A new edition, revised, of a basic aircraft engine encyclopedia. PAUL H. WILKINSON, N. Y., 1945.

AMERICAN HANDBOOK. *U. S. Office of War Information*. A companion volume to the *United States Government Manual*. PUBLIC AFFAIRS PRESS, WASHINGTON, 1945.

SCIENCE YEARBOOK OF 1945. *J. D. Ratcliff*. Latest developments in aviation, chemistry, physics, medicine, and other sciences. DOUBLEDAY, DORAN, GARDEN CITY, N. Y., 1945.

These books are available to AAF personnel through the AAF Field Technical Library Service, which provides for technical libraries at all major installations. For a complete list of books so available, see TECHNICAL PUBLICATIONS FOR ARMY AIR FORCES TECHNICAL LIBRARIES, Book List No. 2, March 1945 and supplements thereto. These lists are compiled by AAF Headquarters Library.
Personal copies of these books may be obtained from the publishers or retail bookstores.

first evaluation, and to effect a finer screening of officers.

The first evaluation reports showed a surprising number of AUS officers to be interested in and—according to their commanding officers—suitable for the Regular Army. However, there were reports that some individuals expressed interest in Regular Army commissions only because they feared that to do otherwise might prejudice their present positions. In the second survey, it is being made clear to all organizations and all individuals that there will be no discrimination against any officer merely because he is not interested in the postwar AAF as a professional career.

As in the first evaluation, information to be obtained through the new reports will be used at this time for planning purposes only. No definite decisions on officers can be made until Congress determines the organization, character and size of the postwar military establishment, including the air force. The evaluation will enable the AAF, however, to act more intelligently and more expeditiously when the time comes to make decisions on individual applications for commissions in the Regular Army or organized Reserves.

The new Form 123, smaller and simpler than the original one, seeks detailed information on the individual officer. To be filled out in each case by a superior officer, usually the immediate superior, it scores the individual on 13 characteristics: intelligence, judgment and common sense, initiative, force, leadership, moral courage, cooperation and teamwork, loyalty, perserverance, reactions in emergencies, endurance, industry and attention to duty, and personal traits and habits. On each characteristic the officer is scored from 1 to 10.

The officer reported upon also is graded from 1 to 10 on his "relative professional position" in comparison with all other officers of the same grade and military occupational specialty known to the reporting officer. The report shows also what attitude the reporting officer would take toward having the individual in his own outfit in war or peace. The desires of the individual toward being commissioned in the Regular Army or the Reserves is shown, and the reporting officer makes his recommendation.

Generally speaking, grade recommendations are made according to age groups, as follows: brigadier generals, 52 through 56; Colonels, 44 through 51; lieutenant colonels, 41 through 45; majors, 34 through 40; captains, 27 through 33; first lieutenants, 24 through 26; second lieutenants 21 through 23; warrant officers, 21 through 44; flight officers, 19 through 23. Any departures from this age grouping in making grade recommendations must be explained.

At the discretion of the commanders of air forces and commands, selection boards or review boards may be established at appropriate places to handle the reports. Where facilities are available, the forms are recorded in machine records. Then, as completed, the forms and corresponding machine record cards are forwarded to the Assistant Chief of Air Staff, Personnel, in Washington, where they will be processed by the Officer Selection Board established in that office.

Jobs For Veterans

The Air Technical Service Command, largest employer of civilian personnel in the AAF, is now endeavoring to find a job for every discharged veteran who is interested in this type of work.

Col. Ralph Nemo, chief of personnel and base services for the ATSC, has announced that every effort will be made to employ discharged veterans as long as vacancies exist in capacities which will use their skills and experiences. The ATSC has more than 6,000 types of jobs in 137 installations throughout the country.

To reach returned veterans in hospitals in the States, the Personnel Distribution Command will interview men to determine where they would like to be assigned and, if discharged, what type of work they would be interested in. At the same time a brochure outlining the ATSC employment plan is distributed among veterans so they may evaluate its possibilities and compare them with jobs offered in private industries.

It is believed that this is the first concrete program to be offered for reemployment of veteran service men, and while the program will be available to all AAF men being discharged for medical reasons, it is anticipated that most individuals will return to private industry and Civil Service. The program is not designed to compete with industry, but is offered as an assurance to the veteran that he will get a job in the government in the event that he does not obtain one otherwise.

Air Evacuation

A wounded soldier's chance for recovery is much better today than it was at the start of the war. Air evacuation in the Pacific has kept stride with new discoveries in medicine and surgery—as well as the thousand-mile surges of Nimitz and MacArthur. This picture shows only a portion of the personnel and equipment necessary to move 24 litter cases from Okinawa to the United States by air aboard one of

All this and cooks too.

Some of the best people.

the Air Transport Command's big transport planes. A total of 160 men and women are shown in this picture, and an idea of the magnitude of the operation may be gleaned from the fact that ATC's Pacific Division carried 68,312 patients out of forward Pacific areas from January 1, 1944 to April 30, 1945.

Meet the Kachins

For two days a radio team of the 10th Air Force, Eastern Air Command, climbed along game trails which took them to their new post in the wild mountain country of Burma. They were to operate there for nine months, completely isolated. It was Christmas Eve when the 10-man team arrived; three operators, three observers, one mechanic, a cook and the non-com in charge, Sgt. Arthur Mittle of Hachuta, N. M.

All knew they were going into country inhabited by natives called Kachins, but they did not know how they would be received. After the two-day climb they reached their assigned peak on the 4,500-foot mountain, so tired they went immediately to bed.

Along in the night they were awakened by the sounds of native voices, and blinked in amazement when two long lines of Kachins passed them carrying torchlights and singing Christmas carols. Not to be outdone, the radio team returned the compliment by singing, "I'm Dreaming of a White Christmas," and "Silent Night."

In a speech the next day an English-speaking Kachin welcomed them as friends.

Men assigned to these lonely outposts give warning of all aircraft and transmit the information to a central plotting station which follows the movement of all aircraft in Burma. In addition to this, these posts serve as centers of good-will between the Americans and the Burma hill people, some of whom had never seen a white man before the air warning personnel appeared.

The medic of this particular group has given medical service to hundreds of natives, visiting settlements for miles around. In return, the Kachins bring chickens, eggs, venison and bananas to the soldiers.

"The men treat these people with genuine respect," said Sergeant Mittle. "There is no such word as 'steal' in their language, and theft is beyond their understanding. They share their crops and game, elect their leader (head-man), never quarrel, and are neither subservient nor arrogant."

As one of the radio men put it, "We never thought that people could be so good as these Kachins."

CAP Supervision

Supervision of the military activities of the Civil Air Patrol, an auxiliary of the AAF, will be delegated to the three flying commands and two technical commands of the AAF Training Command, it has been announced by Lt. Gen. Barton K. Yount's Training Command Headquarters. Col. Earle L. Johnson, CAP national commander, will continue to supervise the civilian activities of the CAP through the 48 state wing commanders, acting in a dual capacity as an AAF officer and CAP commander. Supervision and responsibility for the activities of the Civil Air Patrol were transferred to the Training Command from AAF headquarters in Washington on April 1. Present activities authorized for the CAP by the AAF include search missions for lost Army aircraft, and providing practical ground and preflight instruction in aviation subjects to youths between 15 and 18 years of age. CAP cadets, selected on a merit basis, will be permitted to visit AAF installations during the summer months for a maximum of two weeks to stimulate interest in aviation.

"Or Else —"

It took a special kind of guts to do what Red Erwin did, but in his own words it was "do it, or else."

S/Sgt. Henry Eugene Erwin, 24-year-old communications chief on a B-29, is now recovering from white phosphorous burns at Northington General Hospital, Tuscaloosa, Ala.

Things have happened fast since a night-marish morning in April when a phosphorous flare Erwin had tossed out of the plane blew back inside the B-29.

"The entire ship was filled with yellow smoke and I knew that if it got into the bomb bay it would blow us all to hell and back." Red explained recently at the hospital.

"I felt around on the floor until I touched it. I don't know how I managed to hold on to it—was like dipping my hand into liquid fire. I crawled up into the cockpit about 30 or 40 feet and managed to hurl it out of the window.

"I remember the colonel yelling 'my God, let's get to Iwo Jima!' and the rest of the crew spraying me with 'freeze' from the fire extinguishers. Then I blacked out."

At Iwo the medics did what they could for his badly burned face, arms and legs. A few hours later Erwin was back at Guam in a Navy hospital. While in this hospital the sergeant had two rather unexpected visitors. The first was Maj. Gen. Willis H. Hale, who presented him with the Medal of Honor. Of this ceremony Erwin says, "I was so full of injections it was all a lot of

TRAINING AIDS

Newly Standardized for Field Use

FILMS

TF 1-3754, B-29 Airplane, Ground Handling—Screening time: 20 minutes.

TF 1-3466, Combat Bombing—Orientation for student bombardiers. Composed of combat-film which shows examples of high, medium and low attacks with various types of bombs. Screening time: 17 minutes.

TF 1-3467, P-47 Combat Operations—Shows the pilot various types of missions being flown in the P-47. Screening time: 15 minutes.

TF 1-3468, The Gun Camera Program for Flexible Gunnery Training—Screening time: 15 minutes.

TF 1-3469, Fixed Gunnery Pursuit Curve Firing, Part I—Illustrates the fundamental training pursuit curve and the correct technique which must be learned by all fighter pilots. Screening time: 8 minutes.

TF 1-3470, Fixed Gunnery Pursuit Curve Firing, Part II—By use of a gun pattern demonstrator, the various factors, such as "G" force, slips, skids, etc., which cause misses in fighter aerial gunnery are clearly outlined. Screening time: 11 minutes.

New Films Catalog—Contains latest information on films and film strips approved for AAF use.

PUBLICATIONS

Guide for Training Aids Offices (AF Manual No. 22)—Revised up-to-date edition of handbook of aid training aids officers in performing their duties. Includes sections on requisitioning training aids, disseminating training aids information, types of training aids available, general functions of the AAF Training Aids Division, etc.

Gun Camera Manual for Flexible Gunnery Training (AF Manual No. 25)—Provides a revised outline for a wide gun camera program. Also gives personnel concerned directly with the program standard procedure for their jobs.

Going Down? (AF Manual No. 70)—Reminder of "50-50 proposition" that if "you take care of your parachute, your parachute will take care of you."

Standard Flexible Gunnery Program for Heavy Bombardment Crews Training Stations (AF Manual No. 51)—Covers gunnery equipment for B-17 and B-24 aircraft.

GRAPHICS

Poster no Longer Available—Stock of "Standard Aircraft Taxi Signals" exhausted. Reprint will not be made, since these signals are included in "Pilots' Information File."

Pre-Flight Oxygen Check—Single poster emphasizing ten points in checking oxygen equipment before flight.

DEVICES

Trainer, Demonstrator, Type Q-22 (Night Vision)—Silhouette projector for demonstrating night vision operations under various conditions.

Trainer, Demonstrator, Type Q-25 (Bullet Drop)—Device to demonstrate to gunnery student the drop of a .50 caliber machine gun bullet at various altitudes and at distances up to 1,600 yards.

Trainer, Mockup, Type 0-61 (Astro-Compass)—To show navigation students procedure in using standard astrocompass.

RECOGNITION

Flak—Set of four posters depicting types of flak and methods of evasive action for each type.

Air-Sea Rescue Boats—Set of eight posters with photographs, silhouettes and data on AAF and British air-sea rescue vessels.

Information on the availability of training aids listed in this column, unless otherwise indicated, may be obtained from the chief, Training Aids Division, Army Air Forces, One Park Avenue, New York 16, N. Y., upon request through channels.

mumbo-jumbo and I could barely see the General with my one good eye."

His next surprise was the sudden appearance of his brother, Walter, a Marine who had been flown from Okinawa in a special plane to be at his bedside a few days before Red returned to the States.

A short time later Sergeant Erwin was flown from Guam as the sole passenger, other than the medical officer and attendants who were responsible for his care during the 5,000-mile flight.

He is now recovering at Northington, just 45 miles from his home at Bessemer, Ala. Of his condition, Maj. John F. Pick, a plastic surgeon, says:

"We have had many burn cases as bad, if not worse, than Sergeant Erwin, and I feel sure that even he will be surprised in a few months."

Fruit Salad Recipe

T/Sgt. Johnnie Able, a 21-year-old gunner from the 5th Air Force, has received so many battle awards that he is forced to carry a list of them in his pocket, and the list officially approved. Otherwise, Johnnie is usually mistaken as a refugee from a war movie. Able has received a chestfull of military awards, including the Distinguished Service Cross, Silver Star with one Oak Leaf Cluster, Distinguished Flying Cross, Air Medal with one Oak Leaf Cluster, the Purple Heart with one Oak Leaf Cluster, Asiatic-Pacific campaign ribbon with four battle stars, the Philippine liberation ribbon with one battle star, and the Distinguished Unit Badge with four Oak Leaf Clusters.

Battle Honors

Two more AAF units have been authorized to wear Distinguished Unit Citation badges. The following are condensed versions of the citations, giving the unit designations, the dates and descriptions of the actions, and the number of the War Department General Orders in which the authorizations were published.

487th Fighter Squadron Jan. 1, '45

Lined up for take-off on an offensive patrol mission when suddenly without warning a superior enemy force came in on the deck at the field, this squadron, flying P-51s, immediately took off down the runway directly into the oncoming Germans. The lead aircraft engaged the lead airplane of the enemy formation before becoming airborne, and half-rolled and crashed near the end of the runway. Other planes got off anyway, and although outnumbered 4 to 1 destroyed 23 enemy fighter craft and damaged another without further loss to themselves. They prevented all but a very few of the enemy from penetrating the airfield, and in the fight of an hour's duration completely disrupted the German mission. (GO 47, '45)

445th Bombardment Group (H) Feb. 24, '44

Unprotected by fighter cover, this unit on a 2d Air Division raid on the Gothaer Waggonfabrik, A. G., Gotha, Germany, was under continuous attack from enemy

fighter aircraft for 2 hours and 20 minutes. Antiaircraft was hurled at the group on the way to and from the target. The target was located and bombed with extreme accuracy and devastating results. Of the 25 aircraft which penetrated enemy territory, 13 were lost to fighter attacks, and 9 of the surviving 12 returned with battle damage. This group flew its assigned course, destroying 21 enemy aircraft, probably destroying 2, and damaging 7. (GO 42, '45)

Master Howard

The fact that Howard Wagner is a master sergeant at 21, is further enhanced by the supporting information that he was a first sergeant at 19, and has spent 42 months in the Pacific theater. He was at Pearl Harbor when Japs attacked, went to the Gilberts with assault forces, was an observer on a B-24 on the first raid on Wake, operated with the Navy on submarine patrol, was assigned as an observer with Marine dive bombers, and served as executive secretary to Brig. Gen. C. S. Thorpe, then in charge of the air command in the Marshalls. Sergeant Wagner, now assigned to the MAAF, has 84 points on overseas serviee alone.

Flexible Gunnery

The AAF Central School for Flexible Gunnery, Laredo, Texas, will conduct a flexible gunnery officers course for a limited number of pilots who are in or recommended for the Regular Army.

The program will provide a nucleus of post war officers with a knowledge of flexible gunnery and its problems. Training officers in Headquarters point out that the course will be valuable because the broader the training background of an officer the better qualified he is to serve in a key position in the Army Air Forees.

An applicant for the course must hold a heavier-than-air pilot rating and must have completed an operational tour of duty or be scheduled, but not on orders, for such duty. In addition, he must have reeeived an efficiency rating of excellent or superior on the last two ratings, and he must not have been eliminated previously from any phase of flexible gunnery training.

A maximum of 10 officers will enter each class, starting on Monday of each week, for a 12-week course. Applications should be submitted through channels to the headquarters of the command or continental air force to which the applicant is assigned. Applications of officers who are deemed qualified will be forwarded to Headquarters, AAF Training Command, Fort Worth, Texas. A copy of the officer's Form 66-2 should accompany the application.

The Training Command will select the 10 best qualified applicants for each weekly entrance. Applications of those chosen will be returned to the commander or air force concerned, stating the date on which the officer will report for training. Applications of those officers who do not meet minimum requirements will be returned with a statement regarding the lack of qualifications.

Upon completion of the course, officers return to their originally assigned stations. They get the additional rating of Aircraft Observer (Flexible Gunner). For details see AAF Letter 50-31 dated 14 June 1945.

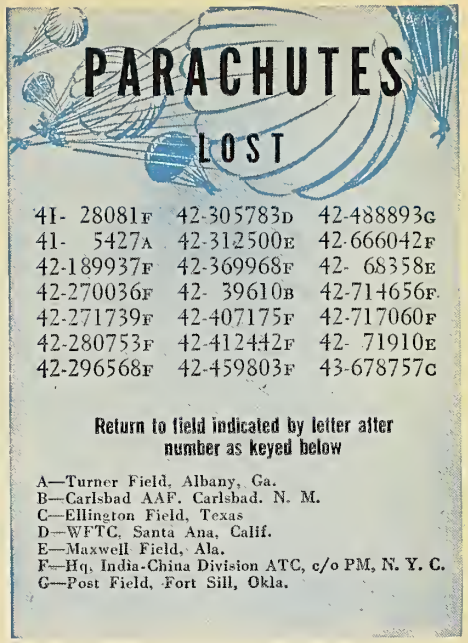
A Day's Work

In 10 months of combat flying, including four major airborne assaults and three operational resupply missions, the 53rd Troop Carrier Wing carried more than 150 million pounds of cargo to the Allies and evacuated 100,000 casualties from the front lines.

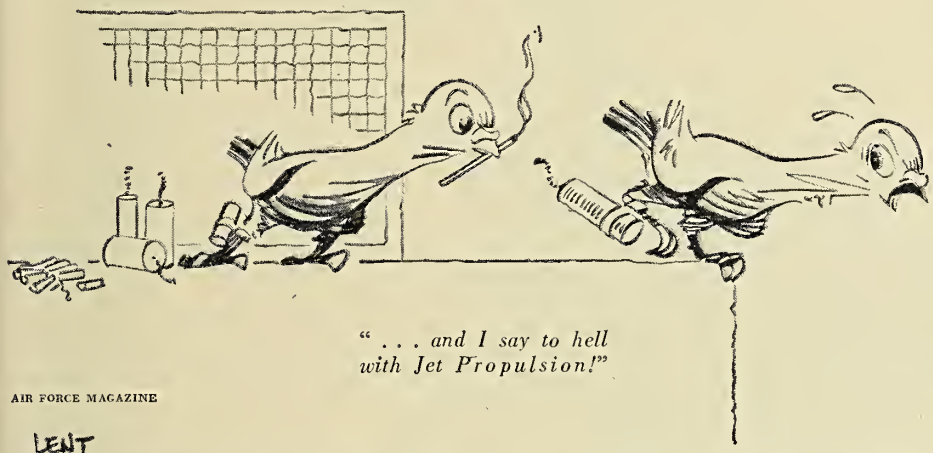
According to a report by the statistical control section of the wing, the 53rd carried out 460 effective resupply sorties, evacuated nearly 700 patients and delivered 278,605 gallons of gasoline and oil—in a single day. These figures, for April 5, 1945, were selected at random from the wing's files and do not portray the heaviest day.

Music Notes

Early in the war a team of civil employees was sent out by the British Ministry of Economic Warfare to search music stores and other shops for harmonicas. A large part of the harmonicas on sale at that time had been manufactured in Bavarian factories which had been turned over to the Germans for aircraft production, and on each instrument was embossed an aerial picture of the plant where it was made. Further aerial views of factories were gleaned from the letterheads of pre-war business correspondence from German firms. Models of the factories were made from these sources for the study of bomber crews. Such were some of the means used to bring about the destruction of key plants and workshops in Munich, Rosenheim, Salzburg, Linz, Budejovice, Regensburg, Ingolstadt and other places, including the Skoda works, now 300 acres of total ruin. Also in a sad state of disrepair are 140 Bavarian harmonica factories. ☆



HOMER



" . . . and I say to hell with Jet Propulsion!"

AIR FORCE MAGAZINE

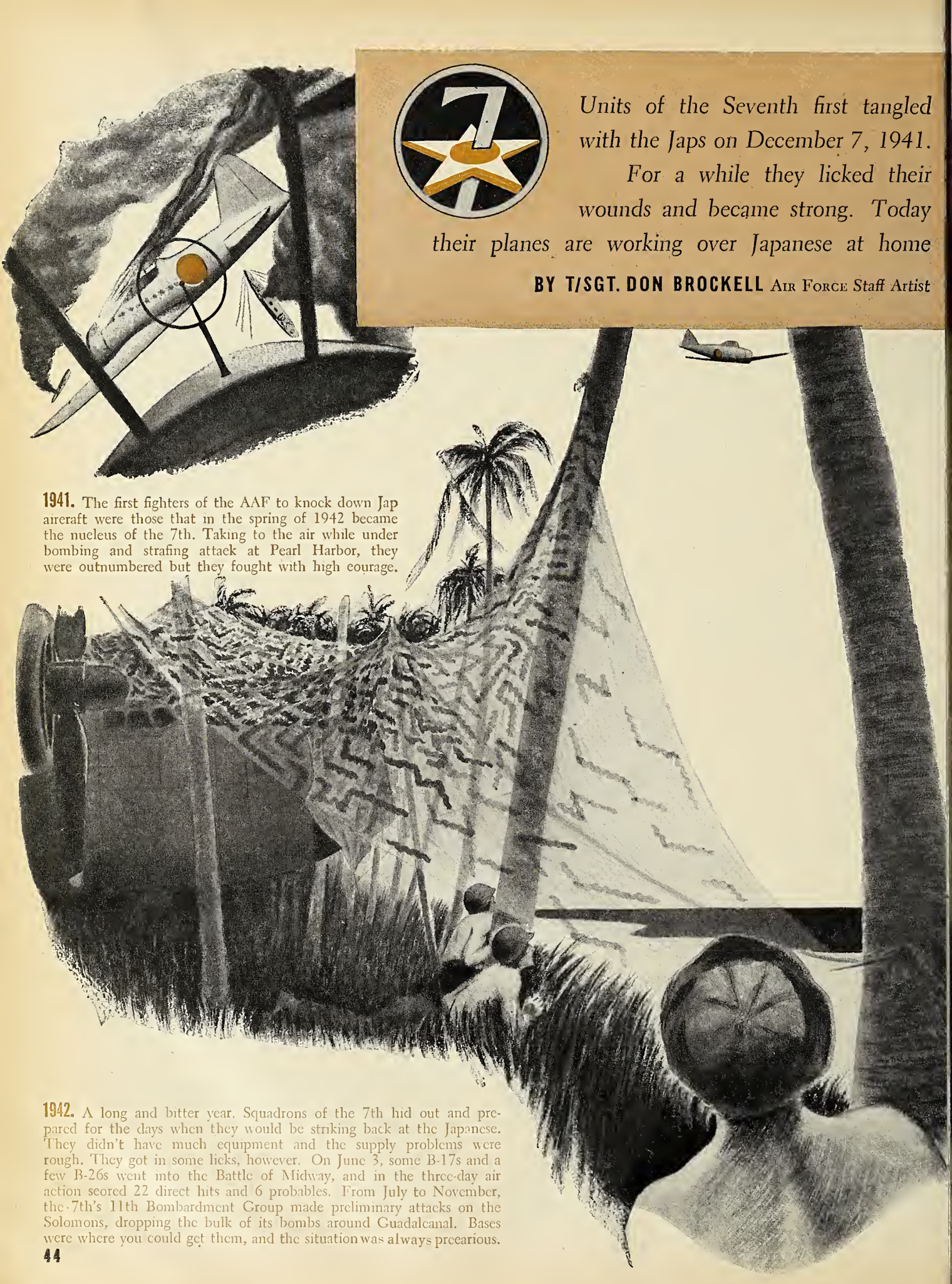
LENT

HOW SHARP ARE YOU?

QUESTIONS

1. What are the men in the photo doing?
2. What airplane is shown?
3. Does the driver of the tug have both hands on the wheel?
4. How many guns do you see on the plane?
5. How many cables do you see running from the back of the tug to the top of the boom?
6. All three men are wearing the same type of hat. True or false?
7. Is the tool box on the tug unlatched?
8. How do you spell the name above the little girl on the nose of the plane?
9. What number appears on the hood of the tug?
10. There is an open container on the front of the tug. True or false?

ANSWERS ON PAGE 62.



Units of the Seventh first tangled with the Japs on December 7, 1941. For a while they licked their wounds and became strong. Today their planes are working over Japanese at home

BY T/SGT. DON BROCKELL AIR FORCE Staff Artist

1941. The first fighters of the AAF to knock down Jap aireraft were those that in the spring of 1942 became the nucleus of the 7th. Taking to the air while under bombing and strafing attaek at Pearl Harbor, they were outnumbered but they fought with high eourage.

1942. A long and bitter year. Squadrons of the 7th hid out and prepared for the days when they would be striking back at the Japanese. They didn't have much equipment and the supply problems were rough. They got in some licks, however. On June 3, some B-17s and a few B-26s went into the Battle of Midway, and in the three-day air action seored 22 direct hits and 6 probables. From July to November, the 7th's 11th Bombardment Group made preliminary attacks on the Solomons, dropping the bulk of its bombs around Guadalcanal. Bases were where you could get them, and the situation was always precarious.

1943. For most of the year, the 7th was preparing for the offensive which would surely come. It started in November and from then on the action was continuous. In that month headquarters was established in the Ellice Islands, 2,200 miles from the "home" base at Oahu. Jap fields were blasted by low-flying Liberators. Bombers based on one island would stage at another, fly over the main target, and instead of turning for home would "ride the wind" on to a third AAF base. Refueling there, they would set out for another target. Eventually they would get home for mail call and the crews would prepare for another trip along the Pacific bombing circuit.

1944. The 7th had gained real strength by now and the Japs were finding it out—B-25s at low-level, fighters and Libs at any height over the Gilberts, the Marshalls and the Marianas. There was little time for making bases comfortable. Inherited from the Japs, they were mixtures of shredded palms, gutted stockades, wrecked runways. "And flies in the day, mosquitoes at night, and dysentery all the time," one CO said.

1945. Far from Hickam and Wheeler Fields, Mustangs of the 7th Fighter Command are thrashing the Japanese at home, destroying workshops and industries, wrecking communications and spoiling Jap dreams of Empire.

AAF QUIZ

Here is something new in AIR FORCE brain twisters. Beginning this month, every question in the AIR FORCE Quiz will be based on information contained in the preceding 12 issues. If you have been reading AIR FORCE carefully, you should ring the bell on this quiz. See Page 56 for answers.

1. An equiangulator is an instrument used in
   - A. Sighting an aerial camera
   - B. Getting longitude and latitude from the stars
   - C. Measuring angles in making mechanical drawings
   - D. Computing airflow
2. The floating air depot used in the Pacific to speed up maintenance operations is called a
   - A. Floater
   - B. FAD
   - C. Ship Shop
   - D. Sea Hangar
3. Which has the greater wing span, the B-19 or the B-29?
4. The members of which Allied air force wear an orange shoulder strip known as the Orange Flash?
   - A. Brazilian
   - B. South African
   - C. Mexican
   - D. Australian
5. What is the military designation of the famed commercial transport DC-3?
   - A. C-46
   - B. C-47
   - C. C-54
   - D. C-69
6. The first transcontinental crossing within 24 hours was made in 1922 by a young officer named
   - A. James H. Doolittle
   - B. H. H. Arnold
   - C. C. L. Bissell
   - D. J. A. Macready
7. The AAF has a pair of glider giants designated CG-10A and CG-16. Which is larger?
8. The official name of the "Rescue Cat" is
   - A. R-6
   - B. Raft, Life, AAF
   - C. OA-10
   - D. Dumbo
9. In its war against malaria, the AAF has made great headway by spraying from C-47s
   - A. Sulfanilamide
   - B. Quinine phosphate
   - C. DDT
   - D. Powdered alum
10. Glip bombing is a recent wrinkle in bridge busting. It gets the name from
    - A. Glide-flip
    - B. Glide from initial point
    - C. Glide into position
    - D. Glide-skip
11. A member of an aircrew wounded on a mission draws flying pay during the period of hospitalization and convalescence.
    - A. True
    - B. False
12. Officers separated from the service are given accrued leave with full pay and allowances up to
    - A. 30 days
    - B. 45 days
    - C. 90 days
    - D. 120 days
13. First altitude test of the turbosupercharger was conducted in
    - A. 1918
    - B. 1940
    - C. 1941
    - D. 1942
14. The Jap Tony is a
    - A. Single-place Navy plane
    - B. Single-place Army plane
    - C. Twin-place Navy plane
    - D. Twin-place Army plane
15. The five stars on the FEAF shoulder-sleeve insigne symbolize
    - A. The five-star grade of the Commanding General, AAF
    - B. The five-star grade of the Commanding General, USAFFE
    - C. The Fifth Air Force
    - D. The Southern Cross
16. *Kamikaze* is the name the Japs have for their aerial suicide tactics. What does the word mean?
    - A. Sons of Heaven
    - B. Spirit of War
    - C. Divine Wind
    - D. Hail to our fathers
17. When the target P-63 is hit by the new frangible bullets in gunnery practice the gunner knows it because on the target plane
    - A. A white flag appears
    - B. The right wing dips
    - C. A nose light goes on
    - D. A bell rings
18. A silver service star is worn in lieu of how many bronze service stars?
    - A. Three
    - B. Four
    - C. Five
    - D. Six
19. Instead of copper, which was formerly used, radiators of the newer P-51 are made of
    - A. Stainless steel
    - B. Aluminum
    - C. Chromium plated nickel
    - D. Fireproof wood plastic
20. Identify this airplane

WHERE WEATHER IS BORN

(Continued from Page 21)

they are for direction and force of wind.

The need for hydrogen provided an additional problem to the weather men. Shipping space was too limited to ship cylinders containing hydrogen from the States. So just the elements for producing hydrogen, ferrosilicon and sodium hydroxide, were brought in. But these proved to be available in only limited amounts, and, while they took up less space than the bulky hydrogen cylinders, still they were an added strain on the Hump tonnage. The problem was solved by Lt. Lester D. Supiro who remembered that hydrogen could be generated by using scrap aluminum and caustic acid, both of which are abundant in China. Now, in reverse lend-lease, the Chinese are making aluminum shavings and refining caustic acid. This example of shipping economy is being followed at other weather squadrons throughout the world.

In areas where there were no ground stations, the assignment of securing weather information was given to a special weather reconnaissance squadron flying B-25s under the command of Lt. Col. James B. Baker.

Because their missions take them over enemy territory, the Mitchells are fully armed and the crews trained for combat duty. Special weather instruments are installed in the nose of the planes where the weather observer-gunner is stationed. His two primary instruments are the aerograph and the psychrometer. The aerograph continually measures the outside free temperature, humidity, and pressure. The psychrometer gives readings of the moisture content of the air. All of these B-25s are equipped with powerful radios which enable them to send back information to their base.

On nights when the Superforts are scheduled for a mission, weather B-25s take off hours earlier and follow the course to be taken by the B-29s. In this manner, exact weather conditions are relayed to the B-29 bases. On one such mission, with Colonel Baker as pilot and the late Capt. Gene W. Dixon, copilot, ice built up so swiftly that the B-25 went into a sudden dive at 11,000 feet. The plane was righted at 8,000 feet by the use of emergency power in an area where the mountains were known to be 9,000 feet. As a result of the information radioed back by Colonel Baker, the B-29 mission was cancelled.

With the weather squadron operating throughout the Pacific, we have turned the tables on the Japs. Previous to the establishment of our weather stations, the Japs had the advantage of observing the weather as it passed over Japan on its way down to our installations south of the Philippines. They knew before we did what the weather would be over New Guinea. Those circumstances are now reversed. From our stations in northern China, we get reports on meteorological conditions over Jap islands before the weather actually reaches there.

The men of the weather squadron put it like this: "Japanese weather forecasts may very well predict, 'Clear today, probably followed by B-29s' " ☆

Mammoth Tire — Page 50

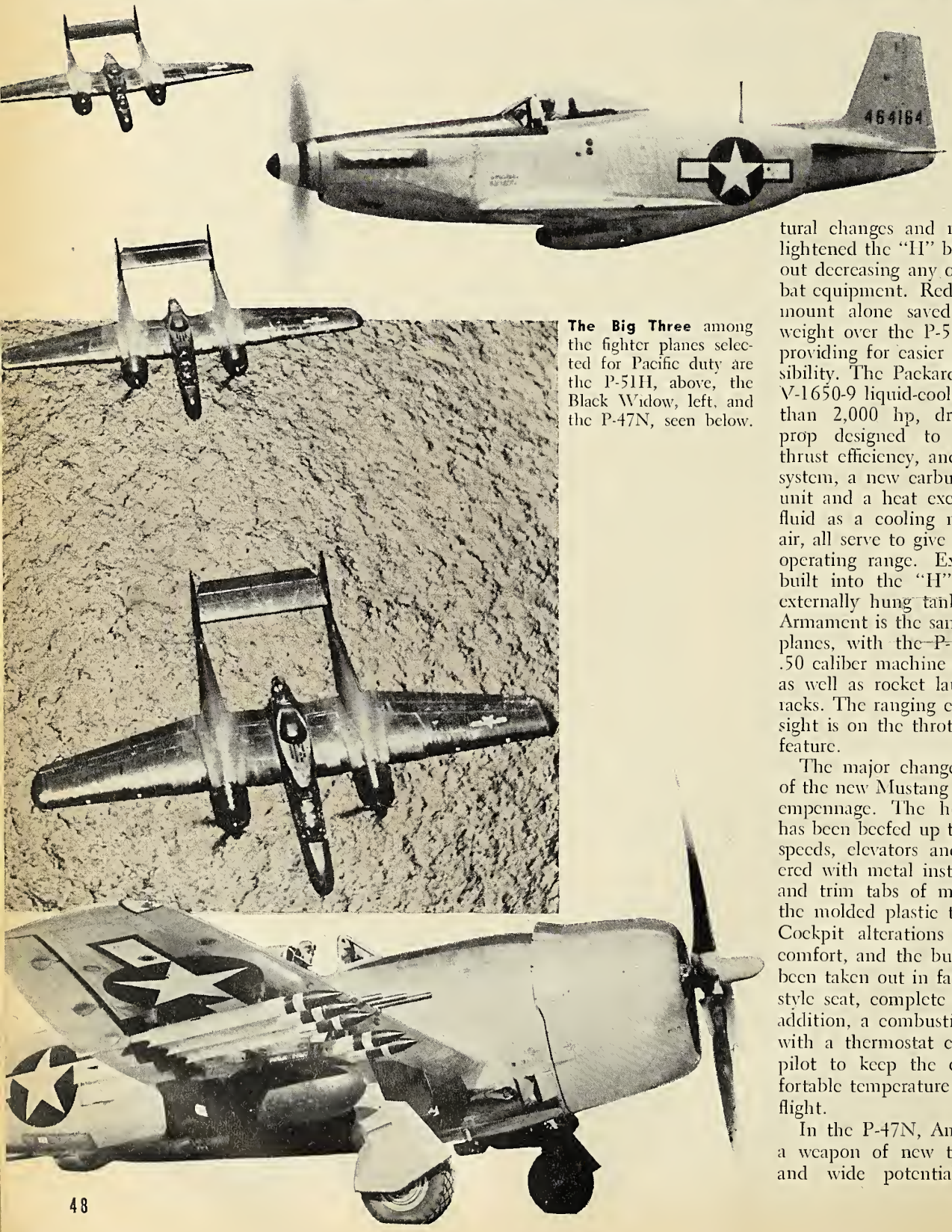
technique

Development, Maintenance and Supply of Aircraft and Equipment

Pacific Fighter Planes

Just as the manager of a baseball team issues a scorecard listing the name, number and position of his players on the understanding that changes will be made as circumstances require, so too the AAF has announced a tentative line-up of the fighter planes it will probably use in the air war against Japan. Of these, the "stars" of the team may well be the P-47N, the P-51H and a new version of the P-61.

Having felt the sting of the P-51D, both as an escort fighter for B-29s and as a ground strafer, the enemy is due for another package of trouble when the "H" model Mustang makes its appearance in the Pacific. This new version is similar to earlier models in appearance, although only about 10 percent of the plane's original features have been retained. A new airfoil and wing plan give the fighter smoother lines, while a more powerful engine and simplified operation controls serve to improve its high-speed performance. The fuselage has a tapered nose that provides the pilot with greater cockpit vision, and larger horizontal and vertical tail surfaces enhance its maneuverability. Weight, too, has been taken into consideration, and structural changes and new materials have lightened the "H" by 700 pounds without decreasing any of its standard combat equipment. Redesign of the engine mount alone saved fully 40 percent weight over the P-51D mount, besides providing for easier maintenance accessibility. The Packard-built Rolls Royce V-1650-9 liquid-cooled engine, of more than 2,000 hp, drives a four-bladed prop designed to deliver maximum thrust efficiency, and a water injection system, a new carburetor air induction unit and a heat exchanger which uses fluid as a cooling medium instead of air, all serve to give the plane a greater operating range. Extra fuel tanks are built into the "H" and conventional externally hung tanks are also carried. Armament is the same as on the earlier planes, with the P-51H mounting six .50 caliber machine guns in the wings, as well as rocket launchers and bomb racks. The ranging control for the gunsight is on the throttle handle, a novel feature.



The Big Three among the fighter planes selected for Pacific duty are the P-51H, above, the Black Widow, left, and the P-47N, seen below.

The major change in the silhouette of the new Mustang is a one-fifth larger empennage. The horizontal stabilizer has been beefed up to withstand higher speeds, elevators and rudders are covered with metal instead of with fabric, and trim tabs of metal have replaced the molded plastic tabs of the P-51D. Cockpit alterations were dictated by comfort, and the bucket-type chair has been taken out in favor of a hammock-style seat, complete with arm rest. In addition, a combustion gasoline heater with a thermostat control enables the pilot to keep the cockpit at a comfortable temperature at all times during flight.

In the P-47N, American pilots have a weapon of new tactical significance and wide potentialities. The latest

model Thunderbolt is powered by a 2,100 hp P&W engine and carries a more efficient G.E. supercharger which gives it greater speed at higher altitudes. Its combat radius of 1,000 miles indicates a comfortable round-trip range of more than twice that distance, while its top speed is set at better than 450 mph. The internal fuel capacity of the plane has been nearly doubled by the addition of eight more gas tanks in the wing section, and the span of the panel has been increased by 18 inches, adding 22 square feet more area. Armed for combat, the P-47N carries eight .50 caliber machine guns aimed by a compensating sight, ten 5-inch rockets and two 500-pound bombs.

It is in flying ease and maneuverability, however, that this new fighter leaves previous models far behind, and the latest developments in instrument engineering combine to make the P-47N an extremely smooth plane to handle. Fatigue and discomfort on long-range missions are considerably alleviated by an automatic engine control, called the type C-1 regulator, which eliminates the need for repeated manual adjustments of throttle, prop governor and supercharger regulator, while further refinements contributing to the new Thunderbolt's piloting simplicity include an automatic control for cowl flaps and coolant doors, a torque pressure meter that calibrates engine torque reaction in pounds per square inch, and many other devices and controls, including the G.E. autopilot, making for operational ease.

The third member of the AAF's "triple play" combination is the versatile P-61, which can rampage by day as a dive bomber capable of toting a bomb-load equal to that of the B-25 or B-26 for short raids, or which can prowl in the dark as a deadly, long-range night fighter. Two external fuel tanks hung from each wing increase the Black Widow's range by fully 300 per cent, while the same wing-rack installations can carry four 1,600 pound bombs or two bombs and two auxiliary tanks. A conventional fighter-bomber release panel located in the pilot's cockpit permits release of the bombs in salvo or individually, while a type LY-3N optical gunsight keeps the plane on its target during dive-bombing attacks.

This "bomber version" of the P-61 also carries complete radar equipment which can pick up any airborne target within a considerable radius. Four fixed 20 mm cannon in the belly and a remotely controlled turret with four .50 caliber machine guns mounted atop the fuselage, provide the plane's armament.

AAF radio operators man their positions in specially equipped C-47 which serves as HQ for Supreme Allied Commander, SE Asia.

Flying Command Post

During most of the successful Burma campaign of 1944-45, a complete airborne headquarters — an entire radio station, set up in a C-47—was generally to be found at the most advanced airfields, enabling the commander of the combined land, sea and air operations to keep in constant touch with forward units and to direct the battle by radio. The moment the C-47 came to a stop after landing, the putt-putts started chugging, the radio operators were at their positions and messages were being transmitted and received. Complete living facilities are carried, and when the plane is on the ground, gas stoves are used for cooking and cots are set up for sleeping accommodations. The communications installation itself is a standard Signal Corps station—the first instance of this type of heavy equipment being permanently installed inside an aircraft for use on the ground.

The idea for the flying command post was developed by Admiral Lord Louis Mountbatten, Supreme Allied Commander, Southeast Asia, and Col. Harold W. Grant, USAAF. The original AAF crew was activated at Wright Field, Ohio, in October of 1943, and with the exception of Col. Grant—who returned to Washington after a tour of duty in the CBI—still remains with the plane. Maj. Jasper Vaughn has moved up from copilot to pilot, and Lt. Norman Boroson is the new copilot. T/Sgt. Herbert H. Carr is flight engineer and is charged with the plane's maintenance, while T/Sgt. Bernard W. Mellen is the radio station chief, and takes over when the craft is on the ground. The radio operators are S/Sgt. George S. Wade and S/Sgt. Arthur J. Fitzgerald.

During the recent engagement at Rangoon on May 2, 1945, Lord Mountbatten was more than 1,500 miles away at an emergency airfield, yet was able to direct operations from SEAC headquarters at Kandy, Ceylon, via radio. Even on his trips to England, he has been able to maintain contact with his troops while parked at an airdrome outside of London.

The project has proved so successful that a number of similarly equipped C-47s have been ordered for use in the distant theaters of operations in the Pacific.

'Turn Around' to China

The planes of the India-China Division, Air Transport Command, must fly every pound of freight to China that can be airlifted, and every minute that is saved by a fast reloading for another flight when the plane has returned to its base, is a minute more that the plane can fly.

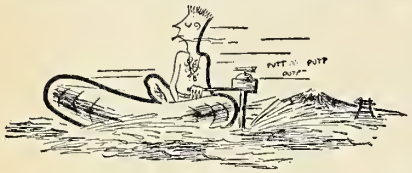
"Turn around," as the process of overhaul, refueling and loading is termed, has been worked out to a fine art. Every detail of the operation is planned in advance, scheduled and reduced to its minimum possible expenditure in time.

The procedure begins even before a plane reaches its base. A radio call from the aircraft winging its way back from China sets the machinery in motion. When the tower operator gets the call and assigns an altitude at which the plane may enter the flight pattern over the station, he also receives a report on the ship's status—affirmative

Men of the India-China Division, ATC, load a Skymaster for turnaround trip to China over Hump. Sketch was made in the plane by Capt. James P. Scott.

tech topics . . . about aircraft and equipment

Sea-rescue technicians are running tests with a small outboard motor which has been specially designed to withstand rough treatment as a droppable-by-air piece of equipment. The motor is for life rafts



dropped to personnel near enemy shores to furnish a propellent means for quick escape to waters where they can be picked up without too much danger to rescuers. . . . A new vertical flotation life vest has been developed which keeps personnel in the water in an upright position. This keeps the face of the individual out of water even in heavy waves. New harness offers increased comfort and is easy to adjust both in and out of the water. . . . Rescue experts are also concerned with a small snap fastener similar to the type used on the B-4 life vest to be attached on the carrying case of the Anti-Exposure Suit. The fastener permits crew members to attach the suit to a D-Ring on the life vest thus making sure they have the suit with them during ditching when sometimes there is insufficient donning time.

A 250-watt electrical heater for sterilizing dental equipment used in the field is under development. At present sterilization is accomplished with alcohol lamps.

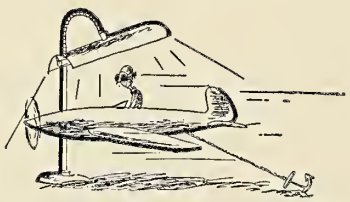
All types of aircraft have factory-furnished microphone switches which means that different types can be found in various planes, making it confusing for pilots and crewmen. Now, specifications have been drafted for a standard microphone switch which will be the same on all types of aircraft, thereby facilitating stock and maintenance problems as well as operational techniques.

A portable test kit has been developed for checking turbo-supercharger regulators and automatic engine controls permitting routine checks without raking the regulator or control unit out of the airplane. The kit, designated Type EE-2 Test Kit, can be wheeled out to the airplane and a convenient check of the regulator and control can be made in several minutes. Previously this was an arduous task that required removing the units, a procedure that took several hours.

The standard Pilot's Winter Flying Shoe is being redesigned for issue to Flight Nurses. The Nurse's shoe will be lighter, more comfortable and still retain thermo insulation properties. . . . Nylon fabrics may be used as a substitute for Byrd Cloth and Boat Cloth in the lightweight Flying Suit. . . . Use of undrawn nylon which stretches like a rubber band may permit pick-ups of heavy gliders without use of mechanical reels and cables. . . . To eliminate bulkiness of parachute seat packs and back packs engineers are studying the possibilities of making the coverall or flying suit itself into a parachute container. The silk canopy would be stowed in the lining of the suit to maintain a low-bulk feature.

Several experimental canopy covers have been devised having special resistant properties to render mustard gas ineffective. Cotton base cloth and glass cloth coated with butyl rubber compound have been tried. . . . Bubble canopies that have excellent visibility features have necessitated the redesign of rear-view mirrors to take full advantage of their improved visibility characteristics. The new mirror offers better demagnification and reflectivity.

For studying effects of sunlight on AAF personnel on the ground, particularly in cockpits of high-speed fighters during simulated low-level flight, engineers have designed a powerful sun lamp whose light source will simulate noonday tropical sun.



. . . To keep the sun out of airmen's eyes two new type visors have been made for standard flying helmets. One is a stationary headband type, the other is an attachable eye shade.

Another transition training program has been born to teach pilots the hidden tricks of the B-32s. At Fort Worth, Texas an operational B-32 used as a "Captivair Trainer" has been mounted on stationary piers in normal flight attitude. Instruments, controls, engines and landing gear operate the same as though the big plane was in actual flight. Instructors in a booth near the plane can simulate various phases of abnormal operation so pilots can familiarize themselves with the plane's peculiarities without risks of actual flight training. . . . A similar ground-bound trainer for P-47N pilots also has been devised and perfected. . . . Another new training aid is a mock-up of the C-69's Engineer's Panel. Complete with enlarged instruments that detail the function of each gadget, this demonstrator will be used for training flight engineers in the location, manipulation, reading and correlation of all controls and instruments.

or negative. An affirmative report means that the plane is ready to go back out over the Hump again with only minor mechanical attention, if any, and in most instances this will be the reply received.

As the plane comes in, Tower notifies Operations and a dispersal area for the cargo carrier is assigned. Meanwhile, Operations has alerted the various sections of the field, including Priorities, Traffic and Engineering, and if there is incoming cargo aboard, Space Control will have informed Air Freight and the latter will meet the plane with trucks, ready to begin unloading by the time it has taxied to a full stop. Even while the unloading is in progress, gas will be pumped into the aircraft's tanks from a giant tractor-trailer unit, while oil will be added as needed and the oxygen supply restored. The necessary minor mechanical adjustments will be made by the ground crew after they have conferred with the men who brought the plane in.

During this time, a new load for China has approached in trucks, and work begins to place it aboard the transport. Distribution of weight is scientifically calculated and the four-ton cargo is carefully tied down. The Maintenance Dispatcher, who has kept track of the functions performed by sub-sections of the engineering department, checks his list to see that all jobs have been accomplished, and at the proper moment, a complete crew arrives ready to board the plane for take-off.

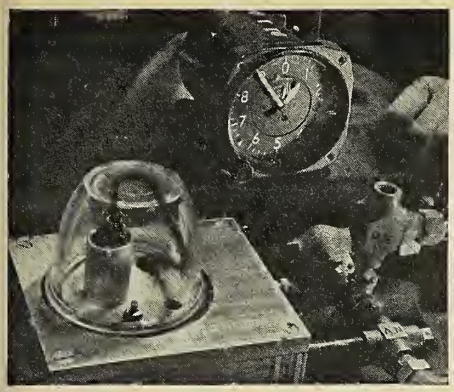
Mammoth Airplane Tire

A huge Goodyear tire has been constructed out of 36-ply nylon and rubber, measuring 110 inches in outside diameter and 44 inches in cross-section. It scales at 1,500 pounds and one-third of its weight is nylon—about 4,000 pairs of hose worth.

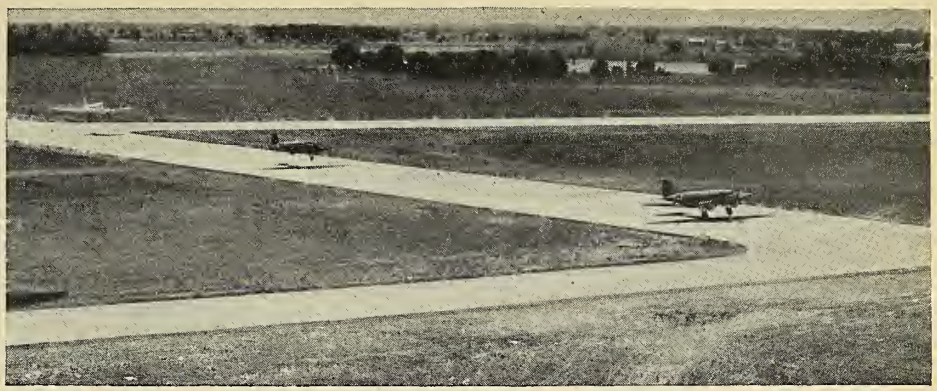
Under hydro-static test the tire has been able to withstand water pressures up to 375 pounds per square inch, or three times the air pressures it would be subjected to under normal operating conditions. Only one of these tires would be required to support the weight of a fully loaded B-29.

Miniature Test Chamber

AAF radio experts are now studying the effects of high altitudes on small pieces of radio equipment in a "baby" pressure chamber—said to be the smallest of its type in the world. No larger than a custard cup, the chamber is able to simulate in less than four seconds any altitude pressure from sea-



Smallest pressure chamber yet devised is used by AAF to simulate wide range of altitudes, temperatures in testing radio parts.



Two C-47s in tandem, with an XCG-17 (glider version of the Skymaster) towed behind them, take off in aerial version of freight train. When a safe altitude is reached, the leading plane will detach itself and return to the field for another such double-header take-off.

level up to 58,000 feet. Inside its airtight glass bowl, tiny switches, condensers, transformers and other radio components may be placed for test, while the enclosure itself may be put inside a temperature chamber for combined altitude and temperature reaction.

Designed and built by the Aircraft Radio Laboratories at Wright Field, the chamber comprises a duralumin base for mounting test objects, a Pyrex cup or glass bowl, vacuum sealed to permit pressurization, and a series of valves and control switches for regulating pressure changes. Variations in pressure are achieved by attaching a large vacuum tank to the apparatus, while delicate needle valves control rates of climb and descent. Altitude is registered on a conventional type altimeter.

Three-Plane Skytrain

A C-47, stripped of its engine and accessories and designated as the XCG-17 Glider, has proved, during flight tests at Wright Field, that a literal "Skytrain" is plausible, using two C-47s and one XCG-17 in tandem. After take-off and a climb to a safe altitude, the leading C-47 unhitches and flies back to its home airfield for another double-header take-off, while the remaining C-47 tows the glider on to its destination.

Fog Dispersal System

When heavy fog banks close in on airfields, it is difficult for returning planes to land safely. But with a series of special burners to convert aviation fuel into vapor gas and thus evaporate excess moisture in the air, low-lying clouds are effectively broken up and normal flight operations may continue even with weather zero-zero. On one occasion during the European air war, twelve Mosquito bombers, returning to climatically foggy England from a raid over the continent were temporarily stranded because their base field and all auxiliaries were closed in. The fog dispersal equipment was turned on and all the planes were able to land safely.

The system was first introduced by the British in early 1943, although a similar arrangement has been perfected by ATSC Equipment Laboratory engineers. In the AAF system, several large tanks store the fuel to be used, a pumping system pressures the gasoline through the pipelines that border the runway, and a series of burners consume the gas with a clear flame while automatic valves regulate and control the heat. A pre-heating system vaporizes the gasoline and ejects it through small jets.

During one test at Wright Field, the system lifted a heavy ground fog in ten minutes. At 0900 hours the ceiling was zero and visibility was limited to 1/16 mile. At 0910 hours, with the burners going full blast, the ceiling had lifted to 500 feet with one-mile visibility, making landings possible.

Magnetic Voice Recorders

A sound-on-wire magnetic voice recording device has now been installed in certain types of aircraft and is turned on to record enemy radio conversations and other radio transmissions which later can be interpreted by AAF intelligence officers.

Specially treated wire, six thousandths of an inch in diameter, is

Grounded Cargo Plane is Reassigned as Tech Supply Warehouse

In India, a damaged C-46 cargo carrier, while withdrawn from service upstairs, still does its bit down below as a supply room for aircraft parts. Carpenters, electricians and other specialists did it, converting interior into neat shelves and bins as shown at right.

maintenance tips . . .

from the crew chief's stand

A "mechanical arm" to help you penetrate deep into airplanes and engines without unnecessary dismantling, can be made from a piece of flexible metal tubing or cable sheathing, according to Captain Joe Brady, sub-depot supply officer at Majors Army Air Field, Texas. As pictured, the device can be attached to a standard electric drill or operated manually, and can be bent to reach virtually any nook or cranny of an airplane without the removal of a large number of parts. It is equipped with more than a half-dozen nozzles, including bores and a screwdriver.

You can muzzle the muzzles of .50 cal. machine guns at the outboard and center positions of P-51Ds, by using a piece of old gasoline hose, 1″ in diameter and 1¼″ long. A wooden plug, ½″ in length is fitted tightly into one end of the hose. These covers will keep moisture out of the barrels, will remain fixed in flight and will fall off when the gun is charged. Suggestion comes from Sgt. C. J. Wold, Fighter Armament Dept., Eglin Field, Fla.

Landing gear difficulties on B-17s have resulted in a great many URs reporting failure of drag links. Pilot error, maladjustment, poor maintenance, rough fields and high gross weights have all been contributing factors, and while these conditions cannot be entirely eliminated, numerous steps have been taken to reduce the sources of trouble by preventive maintenance and changes in basic design, both in service and production aircraft. Consult TO 01-20E-111, therefore, on reinforcement of main landing gear drag links, part numbers ALG100006-10, or 75-4801-609.

To satisfy the demand for interchangeability data on AAF ground equipment, facilities have been expanded to cover this field in the same manner as for aircraft parts, and TO 00-45G-1 is now available on general purpose, special purpose, special equipment and materials handling vehicles. Three phases (engine, power train and vehicle) are covered for each of the four types of conveyance mentioned above.

Semi-monthly inspection of life rafts are required under TO 04-15-2, and although it is common and approved practice to use a vacuum cleaner for inflating and deflating these rubber boats, an adapter is suggested by WO/JG Willard Guerin and Cpl. Robert Finger of an overseas Air Service Group, to make the system more efficient. Materials required are: an AAF vacuum cleaner, Magic Air model 380, Universal Current, 110 v. Stock No. 7900-101470; 1½ feet of 2″ O.D. rubber hose and 5 feet of ⅜″ dia. hose, as well as two 2″ hose clamps, Stock No. 6600-380812; six inches of 2″ I.D. pipe with one end sealed off by welding on an air hose nipple, and two threaded hose pipe nipples, one ¼″ O.D. Stock No. 6500-454820, and the other ⅜″ I.D. Stock No. 6500-454825. This method may be used, along with several others, with equal results to comply with TO 04-15-1, dated 15 August 1944.

Leaks in tubes can give you radio trouble, but so can leaks in the radio compartment itself—and water seeping into B-17s and other planes has been known to short out communications equipment. To prevent these difficulties, follow TO 09-1-10 on waterproofing and sealing the plugs and sockets on aircraft radio sets.

With moving day having arrived or impending for many overseas units, someone—and usually everyone—has to help pack supplies for reshipment. To reduce breakage, save time and prevent corrosion, observe the following common-sense rules:
1. Clean dirt and fingerprints from critical parts and dry them thoroughly. Apply a coat of light oil, wrap parts in greaseproof paper and pack with cushioning material. Line the container with waterproof material and strap the package on all sides.
2. Temporary storage is best in a closed, heated building. Next best is a low shelter with roof and floor but no side walls. When neither of these is available, store material above ground level and cover loosely with tarpaulins.
3. At each supply base, only unpack that equipment which you need. The best protection against heat and humidity is the original carton, so don't break it.

wound by motor on reels in much the same manner as a motion picture projector. The wire records sound magnetically, while a control box permits remote operation and enables the pilot to record directly from his own microphone, from the plane's interphone system, or from the radio messages of other aircraft. Inputs are provided for recording from standard AAF radio receivers or from a carbon or dynamic microphone.

A recorder-reproducer, used in conjunction with the airborne voice recorder permits ground playback on the wire transcription, and can reproduce recordings as well as rewind and erase the wire in preparation for its re-use.

A similar airborne apparatus, employing a disc or record instead of the wire, is used in reconnaissance airplanes to free pilots from having to make written notations of their observations, pilot their craft and maintain a lookout for the enemy at one time. With the voice recorder, the flyer simply talks into his microphone, describing what he sees and making a record of the whole flight, while leaving his hands free to control the airplane.

Hydrogen Making in China

By way of reverse lend-lease, Chinese natives are doing their bit to cut down Hump tonnage by taking part in the local manufacture of hydrogen for the AAF's weather balloons. Under the supervision of Kunming University, caustic soda is shaved so that its alkali action on aluminum scraps, when mixed with mercuric oxide, may produce the lighter-than-air gas for balloons used in obtaining meteorological data.

Crashed, wrecked and unserviceable planes are stripped of their unreclaimable aluminum, which is then broken up into small pieces and placed inside a cylinder. Water is then poured in,

Man "churns" hydrogen from cylinder in which aluminum and a caustic soda compound are mixed to produce gas for weather balloons at Kunming.

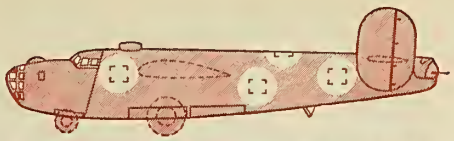
and the caustic soda compound is added. Next, the top of the cylinder is capped and the whole thing is swung back and forth like a giant cocktail shaker. In a short while the hydrogen generates, and after it is cooled down it is piped into the Weather Squadron's balloons.

Markings for Escape Hatches

By agreement of the American and British Army and Navy, all emergency exit doors, hatches, knobs, handles, releases, catches and stencilling on all aircraft are to be painted orange-yellow (Spec. AN-L-29 Lacquer or AN-E-3 Enamel, Color No. 506) so any passenger or crewman immediately can locate the nearest exit for bail-out or after a ditching or crash landing.

The newly standardized method of marking exits requires a one to two-inch orange-yellow band around the periphery of doors and hatches inside the fuselage. "Emergency Exit" is to be painted in one to two-inch lettering on the most visible portion of each escape hatch, and one-half to one-inch lettering is to be used to describe the operation of the handle, as "Pull," "Push," "Twist," "Turn," "Slide," etc. All releases, handles, and knobs are also to be painted in this color.

To facilitate forced entry from the outside into a crashed aircraft (see TECHNIQUE, February, 1945) a half-inch wide and 1-inch long series



of dashes at 12-inch intervals will outline hatches, domes and doors. 1-inch lettering will read "Cut Here for Emergency Rescue." Also to be painted on all such external positions is "Escape Panel Releases." On yellow surfaces, marking should be in glossy black paint.

Parachute Fall Recorder

"Dummy Joe," the rubber figure who has been bailing out for the AAF since parachutes came into existence, is getting a new mechanical "brain" that will record everything that happens to him from the instant he is pushed out of a plane until his form hits the ground.

Designated the Parachute Drop Recorder, Type S-201, the device is fixed in the hollow dummy by web straps and obtains high-speed bail-out data in a single drop test that previously required several descents. It is enclosed in an aluminum case about the size of a storage battery, and consists of a chart carriage with spool arrangement similar to a large roll-film camera, a pressure-actuated altimeter unit that records continuous height, an accelerometer for determining opening shock, a time-release marker that tells the exact instant when the ripcord is pulled —thus giving the opening time—and a swing counter that picks up and records all oscillations.

These sensitive instruments transfer their data to four electrically operated styluses that scratch coded graph lines onto a special metal-foil backed paper that is wrapped around the carriage rollers. After a drop test, technicians decode the fine scratches with a calibrated celluloid mask, and the results tell them the exact moment Joe's chute opened, the G-forces of opening impact, the rate of fall, the body's position at any altitude during the descent, and the oscillation of the body and the parachute.

The instrument was developed jointly by the Parachute Branch, ATSC Personal Equipment Laboratory and the Hathaway Instrument Company.

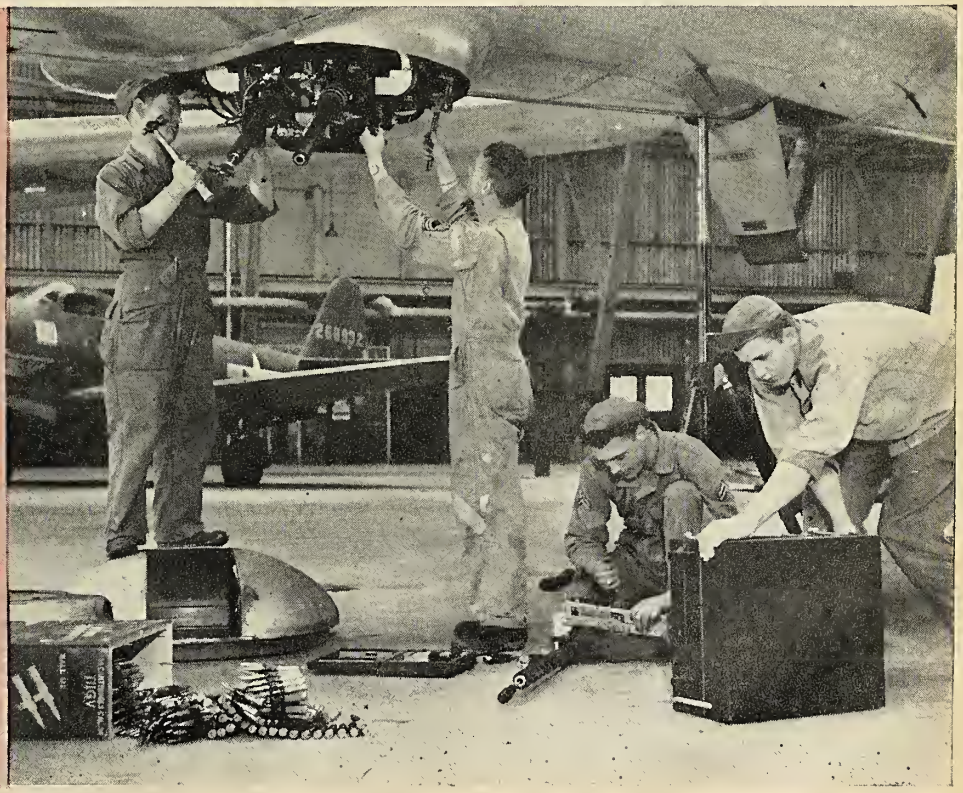
Pneumatic Bomb Bay Doors

Lightweight air compressors, each slightly larger than a milk bottle, are swinging open the doors of late model B-29 bomb bays in a mere two seconds, as against the quarter of a minute required by the conventional electro-mechanical methods.

Component parts of the pneumatic system include a small electric motor that drives the compressor, an automatic switch control, a pressure storage tank, a cooling fan and a centrifugal pump that lubricates the pistons and bearings.

what's wrong with this picture?

The "harmament" specialists shown here are missing TO 11-70A-1 by a wide margin, and their technique is shot through with at least seven gaping errors. These are scored on Page 55, but don't aim your sights in that direction until you've gone gunning for another misfire or two. Providing the target this month, are (from left to right) T/Sgt. Herbert C. (Bing) Crosby, M/Sgt. Charles J. Godley, Cpl. B. Krueger and Pvt. Luther Harper, all of the 4000th BU, Wright Field, Dayton, Ohio.



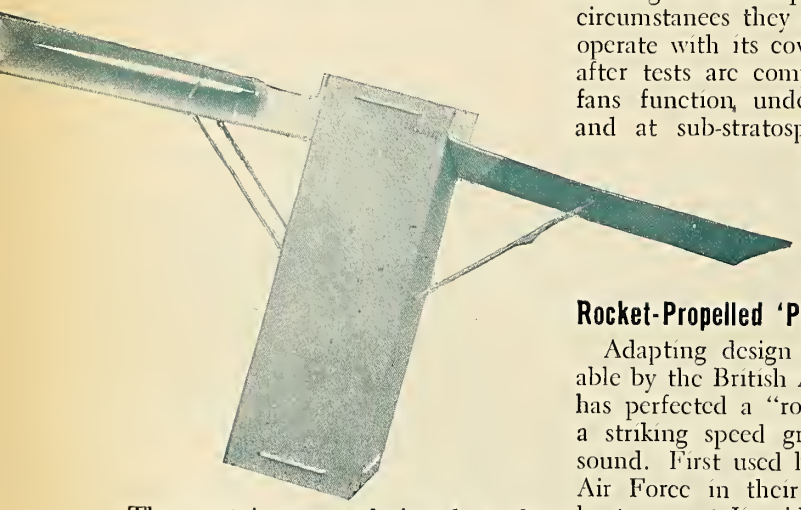
The compressors are also being used for operating gun chargers for the Superfort's flexible turrets, and similar pneumatic gun chargers are being installed in P-51Ds, B-25s and A-26s.

Cargo Container Floats to Earth

An inexpensive, easily made and efficient substitute for cargo parachutes has been perfected in the form of a fiberboard and plywood box with collapsible rotors, or wings, which open like an umbrella blown inside out when the container is dropped from a plane, limiting its rate of fall to a slow spin.

The 12" by 12" by 34" cargo carrier will support 50 pounds of supplies and its speed of descent so nearly approximates that of a parachute that fragile items, such as glass, may be loaded into it without danger of breakage. Unlike a chute, however, it will not drift with the wind, will not hang itself in trees, will not be dragged along the ground and cannot be spotted easily by enemy ground patrols.

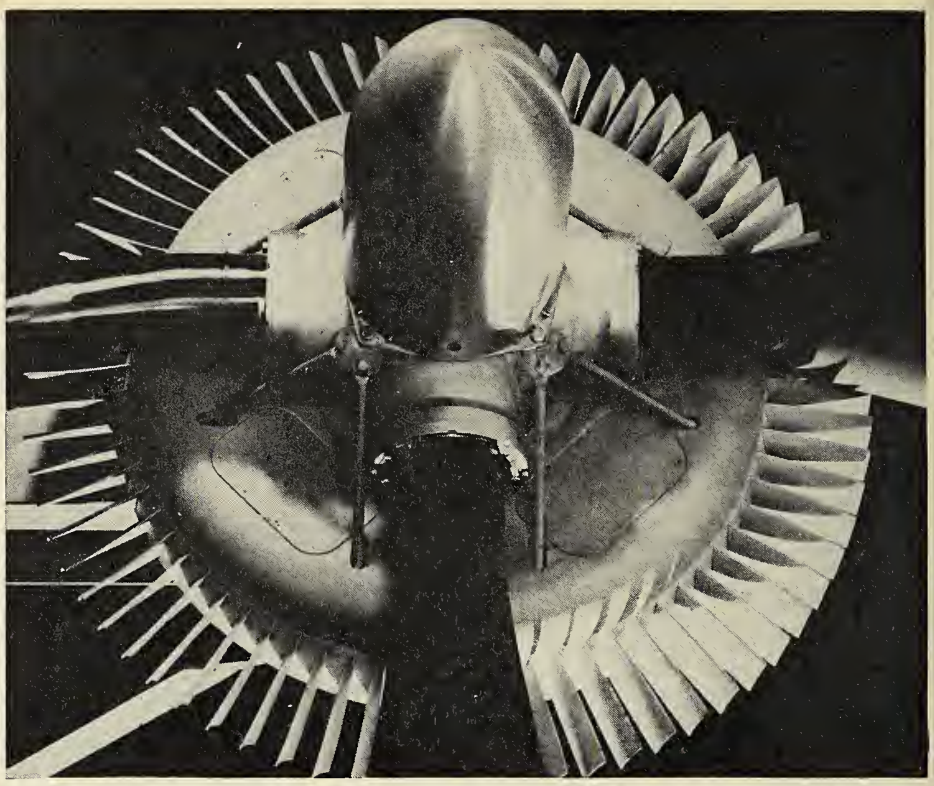
The center of gravity is low enough to keep it upright in the air so that the airstream can snap open the two folding wings attached high on the box. Sash cord holds the rotor blades at the proper spin angle, and spoilers on each blade further reduce the rate of fall.



The container was designed at the Forest Products Laboratory, costs less than $4 and can be manufactured at the rate of nearly 1,000 an hour.

Added Hp Through Cooling Fans

Through the mounting of cooling fans on certain types of aircraft engines, as much as 200 additional horsepower may be made available at high altitudes or in climbing. The fans, which are driven by the engines they help cool, are installed directly behind the propellers and serve to increase the flow of air among the finned cylinders of the engines at greatly reduced cost in drag to the airplane. Under many circumstances they permit the craft to operate with its cowl flaps closed, and after tests are completed on how the fans function under icing conditions and at sub-stratosphere altitudes, installation will be made on some of the most powerful types of AAF engines.



By mounting a cooling fan on the propeller shaft, additional horsepower may be available to engines at high altitudes. Spinning vanes of the fan eliminate need for cowl flaps.

Rocket-Propelled 'Power Bomb'

Adapting design details made available by the British Admiralty, the AAF has perfected a "rocket bomb" having a striking speed greater than that of sound. First used by B-17s of the 8th Air Force in their attacks against E-boat pens at Ijmuiden, Holland, on 10 February and 14 March, the missiles were able to penetrate the thick layers of concrete and pierce the massive roofs of the pens, causing great damage to facilities inside.

The rocket-propelled bomb is carried at normal flying altitude and aimed by the usual sighting technique, maintaining perfect stability from release to strike. Initially, however, operational use of the bombs presented many difficulties that required hazardous trials, and with Col. Algene E. Key as test pilot, the new weapon was first dropped over bombing ranges in England.

The task of making the bomb usable in AAF operations was carried out by the 8th Air Force Technical Operations Section, then headed by Col. Benjamin Kelsey.

Preparing Requisitions

"If requisitions are prepared intelligently and correctly at the point of origin," states Lt. Col. A. P. Bondurant, Supply Division, ATSC, "many future difficulties are avoided." Basing his statement on a particular instance where improper requisitioning at an overseas base resulted in some duplications through supply channels, Col. Bondurant further emphasizes the importance of ordering only what is actually required. To eliminate such contingencies and to simplify requisitioning procedures, he recommends that the following rules be observed:

1. Place a tab on the stock record cards of those items which are issued most often, and keep a careful accounting of the tabbed cards so that stocks may be replenished at the same rate at which they are distributed.

2. Set up a maximum-minimum stock level for each item based on how quickly it moves and how long it takes for replacement stock to arrive. This maximum is never to be greater than the allowable level under the prescribed

stock levels for individual theaters.

3. If ordering is necessary, look at the record to see how long it took to reach the minimum level, and then determine whether or not it is necessary to requisition all the way up to the maximum level.

4. Before actually ordering, find out how many you should request by checking on how many parts were issued for the previous ninety days, and whether or not the rate of issue has accelerated or declined.

5. If you find that a special item is in particular demand, find out why, and act accordingly. It might be a modification that will not recur, in which case you will order only enough to suit the circumstances. On the other hand, it might be caused by a change of a continuing nature, necessitating large stocks. ☆

WHAT'S WRONG with the picture on Page 53

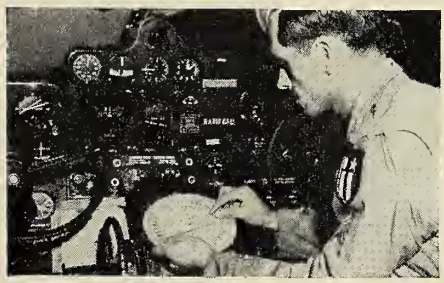
1. If mechanical appliances could talk, the AN connectors in the turret would be crying, "Lay that hammer down" to the man at left. A strap wrench is the tool for removing these.
2. Examination of the turret dome would reveal that the man standing on it requires a dome examination of his own. Inspectors say "nix" to nicks.
3. Ammo is meant for the enemy, but the .50 caliber machine gun bullets strewn on the floor will collect dirt and cause the guns to jam.
4. See the boresight tool sticking out of the barrel of the gun on the left? If it's left in the gun—as sometimes happens—it will completely wreck the barrel when the m.g. is fired. Besides, with guns pointed groundward, there is also a chance that the tool will fall to the floor and break.
5. The corporal may be under the impression that he knows something about gun charges, but he's a three-time wrong doer. That screwdriver has no authorized business sticking in the barrel of the gun, nor should the gun cover be left open to collect dirt. He's also pulling the screwdriver in his hands the wrong way, which will jam up the timer motor in the gun charger.
6. Lettering on the Selsyn caps of the guns clearly warns against the use of wrenches, but the Sgt. in the middle left his reading glasses in the barracks. Also, using the gun charger hose to pull the turret around isn't a very bright idea.
7. The big black box on the right is the "brain" of the gun turret, and should be handled with care. Computers should be picked up and carried by two men—never dragged or pushed along the ground.

on the line

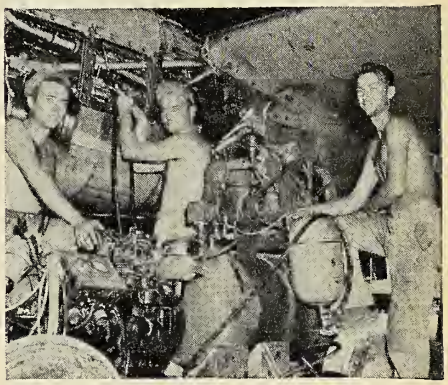
with mechs around the world

As a member of the AAF during both World Wars, M/Sgt. Christopher Stanton of Mering, Iowa, knows the value of speed in maintenance operations. His oxygen refilling apparatus, mounted in a trailer and hustled about his overseas base by rapid jeep, has considerably shortened the time required for replenishing oxygen bottles over that normally consumed by the wheel cart transportation previously used. Sgt. Stanton's equipment consists of regulation regulator valves, filters and safety valves.

To aid their crash-landed B-17 to make a take-off short enough to clear fences and trees at the end of the small ploughed English field in which they had been forced down, the crew of this Flying Fortress mounted twelve rockets under the wings of their plane to accelerate its movement across the short runway. The successful experiment was conducted by Capt. Richard G. Holub, Grass Valley, Calif., and may be adopted for bombers which crash-land away from sizeable airstrips.



Periodic adjustment of airplane compasses promises to be a simple job at the AAF's Bu-Karuchi airbase in India, thanks to the Compass Swing Computer developed by Sgt. Stanley Wawrzynek, Detroit. The instrument specialist's device consists of two discs, one slightly less in diameter than the other. Both are calibrated in degrees and spaced with the basic compass markings. To find the compensation necessary for an off-the-beam compass, readings are taken of the master compass and of the compass being adjusted. The two discs are then brought together accordingly, and the correction factor will appear through a slot in the smaller disc. Here Sgt. Wawrzynek uses his gadget in the cockpit of a C-46.



A little mugging seems in order as the builders of this time and labor-saving vehicle group themselves around their contrivance, with which they are able to bring almost every type of test and servicing equipment direct to bombers on a single chassis. The scene is a Pacific airbase, and the characters are, from left to right, T/Sgt. Nobile J. Grace, St. Petersburg, Fla., S/Sgt. Edgar E. Seale, Boligee, Alabama and Sgt. John A. Jauken, Oxford, Nebraska.

Deep in the heart of China, a large percentage of P-51 missions were aborting due to the condition of the fuel on arrival at the advanced fighter base. The barrels were old and rusty on the inside and there were no containers to which the gas could be transferred. The solution came when a B-29 made a crash landing on the field and its bomb-bay tank was salvaged and set up as a fueling station. Shown above, a mechanic gasses up a Mustang from the tank while men in background transfer fuel to the large receptacle from the original drums, filtering the gasoline through several thicknesses of chamois cloth. Idea for the tank arrangement originated with Lt. William Fleming, engineering officer.

SCANDINAVIAN CARPETBAGGER

(Continued from Page 29)

"There it is!" he yelled. "The highest mountain in Norway. I wanted all of you to see it."

Encouraged by the success of the first mission, Balchen's airline strove to fly carpetbagger operations whenever weather conditions were favorable. Increasing quantities of supplies went down to the patriots and word came back the resistance forces were using them to good advantage. Balchen's men had great admiration for the patriots and they took to writing them notes of encouragement. They also enclosed cigarettes and copies of American magazines in the packages. The patriots delighted in taunting the Gestapo by leaving the magazines in the lobbies of Norway's principal hotels.

During the course of these missions, the Liberators also dropped Allied secret agents and soon a highly efficient intelligence network was established. Liberator crews also brought back considerable information about the enemy's northern defenses. On one occasion they spotted a hidden airfield harboring new types of jet planes. Another crew discovered installations that were identified as V bomb sites.

Late in the summer of 1944, the British were informed that one of Germany's highly secret V-2 rockets had fallen into Swedish territory. The rocket failed to explode and was almost intact when the Swedes found it. The Swedish government was willing to give it to British scientists but the problem was how to transport it to military laboratories in the south of England.

Inevitably, the British called on Balchen. Would he bring back the rocket? Balchen said he would. A message was sent to Stockholm. Load the rocket on a Liberator and bring it down at once. A reply came back in a few hours. The rocket weighed 8,000 pounds. It was dismantled and crated and the crates wouldn't fit into the Liberator.

Balchen went into a huddle with Allen. They decided the only way to bring that rocket back to England was in a C-47. Allen agreed to try it.

He flew over to Prestwick immediately to borrow a C-47 but the only one available was a battered airliner known around the base as "The Bug." Its magnetic compass was faulty and the radio compass didn't work at all. Operations refused to take responsibility when Allen told them what he intended to do.

Quickly the blue and black invasion stripes were painted over and commercial airline markings stencilled on the wings. Allen took off for Stockholm with Durham, Withrow and a Norwegian radio operator named Engeland. When they landed in Sweden, "The Bug" did not have enough gas left in its tanks to taxi to the hangar. After the crates were loaded aboard. Allen was told that all flights over Norway had been cancelled because of the lack of cloud cover. He decided to risk it and "The Bug" took off with its heavy load, barely clearing a pile of rocks at the end of the runway. In the bright daylight over Norway, the transport would have had little chance if spotted by enemy fighters but luck was with it and it reached the North Sea without detection. German shore batteries took some shots at "The Bug" as it roared across the coastline but their aim was poor. At seven the following morning the rocket was in the hands of the British.

Having demonstrated that nothing was too difficult for it to handle, Balchen's secret airline soon was asked to undertake another seemingly impossible job.

For a long time, Allied air forces had been trying to sink the German battleship Tirpitz, but as of September, 1944, the vessel was still afloat at her anchorage at Altenfjord, Norway. Except for photo reconnaissance pictures, intelligence had little information regarding the condition of the warship or about the antiaircraft defenses protecting the harbor approaches. The only way to find out was to drop spies in the area with the hope that they could send out reports by portable transmitters.

Allen and Schreiner agreed to fly two Allied secret agents as close to Altenfjord as possible and a B-24 quickly was modified to permit installation of additional gasoline tanks in the bomb bay.

The flight from Britain to the drop zone and return covered more than 2,600 miles and took 16½ hours. It was probably the longest combat mission ever flown in the ETO. The two agents parachuted down close to the harbor and within a day had established contact with England.

On Sept. 21, 1944, Allen and the old reliables — Schreiner, Durham, Jesperson, Sage, Bollinger, Krasevac, Schick, Neil and Richards—took off to drop several spies in a heavily-defended region of Norway. The secret agents came down successfully but one of the Liberator's engines suddenly went out. Allen decided to head northeast to Murmansk for an emergency landing rather than risk the long return flight to Britain. The plane was just passing over the outskirts of Murmansk when it was coned in the searchlights of the harbor defenses. Antiaircraft batteries from the Soviet battleship Archangel let loose a heavy barrage.

The Liberator shuddered under the impact of a direct hit and Allen ordered his men to bail out. He kept flying level until all had gone over the side and then prepared to follow. But another shell tore through the wounded bomber. The Liberator faltered and then plunged into the water, a flaming mass of wreckage.

The Russians deeply regretted the tragedy which nevertheless was excusable for there had been no opportunity to alert the warships and harbor defenses that a friendly airplane was approaching.

Allen was buried with military honors at Murmansk and to the small wooden cross over his grave was affixed the simple inscription:

"In performance of duty."

It was a grevious loss to Balchen and the others who had performed so valiantly in all the Scandinavian operations. But their work continued. And it was not until victory came that the exploits of these men could at last be heralded to the world. ☆

progress report on eggbeaters

(Continued from Page 26)

stretcher cases were strapped to the outside of the fuselage and evacuated successfully.

The scale of tactical use of helicopters increases daily as new aircraft—the R-6A particularly—are delivered to overseas theaters. The Coast Guard—flying Army designed helicopters—has already performed several dramatic rescues at sea and on thawing ice with the eggbeaters; shortly the windmills will be at work with ground troops as artillery spotters, liaison craft, and wire layers.

Now being produced in addition to the R-6 is another Sikorsky design, the R-5, which is a much heavier helicopter powered with a 450 horsepower Pratt and Whitney engine. At the same time "Y" and "X" craft like the Kellet XR-8 Synchropter, the Platt-LePage XR-1A and others are being tested, improved, and readied for production. Drawing boards all over the country are covered with "revolutionary" helicopter designs.

Beyond a doubt the future of the craft is enormous—but we mustn't let speculation about the helicopter of tomorrow make us forget that there's a helicopter today; already at work, already frightening cows and chickens as it hedgehops across the U. S. or gathering crowds at places like Iwo Jima and Guam when it lands on or near an airfield. Recently 17 helicopters of the Helicopter School flew cross country from Chanute Field, Ill., to Sheppard Field, Texas—the largest and longest mass flight of "eggbeaters" ever—and at one point got lost, landing near the town of Ringling, Okla., for gas and directions. A woman who stood on the porch of her farmhouse and watched the things cover her cornfield like a swarm of locusts summed up the current progress of the AAF helicopter. "My God," she said. "Horoscopes! And I thought we'd have to wait 'til the next war to see any horoscopes!" ☆

Answers to Quiz on Page 46

1. (B) Getting longitude and latitude from the stars
2. (A) Floater
3. B-19
4. (B) South African
5. (B) C-47
6. (A) James H. Doolittle
7. CG-10A
8. (C) OA-10
9. (C) DDT
10. (D) Glide-skip
11. (A) True
12. (D) 120 days
13. (A) 1918
14. (B) Single-place Army plane
15. (D) The Southern Cross
16. (C) Divine Wind
17. (C) A nose light goes on
18. (C) Five
19. (B) Aluminum
20. Jap Tony

MASTER OF THE MESS

(Continued from Page 27)

in tall stories of AAF mess as Brandman's Banquet, tribute to the sergeant who made it a reality.

Probably the biggest effort of this kind was engineered by an operator in the Pacific, T/Sgt. Patrick Finn O'Toole. Sergeant O'Toole isn't descended from the Kings of Ireland for nothing. One morning word came that a USO troupe, including a Hollywood star much admired by the sergeant, would stop over several days later. Immediately O'Toole laid plans on a regal scale. Regular supply was relied on for bare necessities. Special Service was called on for place cards. Returning from Australia, a bomber crew brought the makings of ice cream, for which mechs devised a freezer run by jeep-power. A medic suggested native roots and berries for an exotic salad. Morning high-altitude missions guaranteed cold beer. Toward the end of the celebration, the glamorous guest of honor was asked what most impressed her during her war travels. Impartially, she replied: "The Pacific Ocean and Mess Sergeant O'Toole."

Inventors and instructors among mess sergeants hold specially important jobs. If it weren't for the ingenuity of the first, many a squadron in the field might go half hungry. M/Sgt. Edward Q. Bell, who learned how to build a kitchen around a field range and such odd buckets, pipe, sticks, pans, sand and clay as he could rake together in New Guinea, now demonstrates his impromptu methods to B-29 mess personnel at the Smoky Hill, Kan., airbase. Sergeant Bell, who remembers the "old days" of early 1942 in the Pacific, is a practical man, thankful for fundamental things in life such as odd gas cans that provided him with the makings of dishwashing machines and fighter planes that kept the Japs from blowing up his stove. Associated with him at the Flight Feeding School is S/Sgt. Floyd L. Leinbaugh, who has studied all angles of mess—including those of the infantry and Naval air. Sergeant Leinbaugh's chief concern now is training officers and men to supervise and prepare the type of meal required by B-29 crews, but he has been equal to highly specialized jobs such as advising on equipment.

When it comes down to the fine business of getting meals, mess sergeants are indispensable. Whether it's difficult business, such as providing freshly baked bread to maintenance crews on a new strip in the Pacific, or the more sentimental job of whipping up a birthday dinner for a little girl named Mary, just adopted by a bomber group in England, the mess sergeant is central to the scheme. He gets a large part of the credit for a first rate mess system. ☆

PICTURE CREDITS

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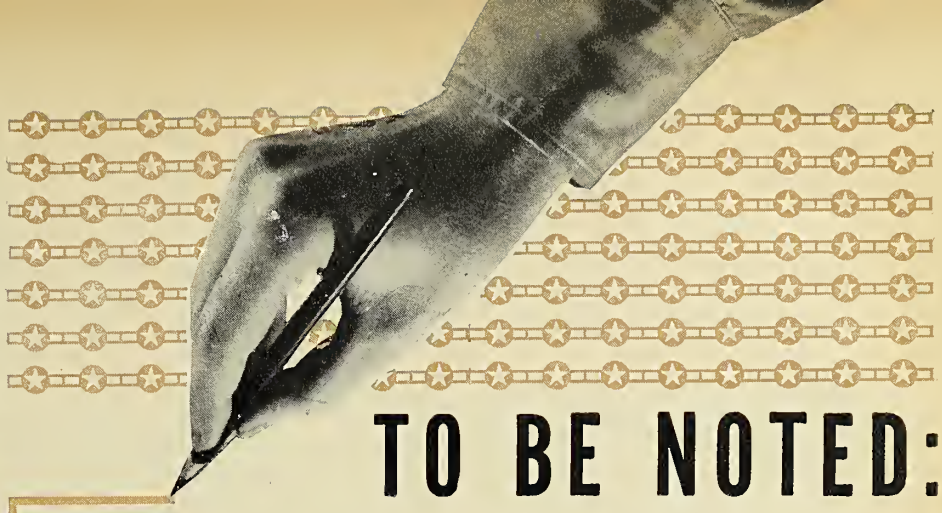
All other illustrations secured through official Army Air Forces and Signal Corps sources. Requests for prints of photographs for official use and publication appearing in AIR FORCE, should be directed to the AAF Photographic Library, Headquarters, AAF, Washington 25, D. C.



TO BE NOTED:

Alien Overseas Wives: Army Emergency Relief funds will not be used to finance the entry of alien overseas wives of Army personnel into this country. (AAF Ltr 39-43, 27 April 1945)

Longevity Pay: Enlisted service performed in the National Guard by an individual prior to the attainment of 18 years of age may not be counted for longevity pay purposes. (See III, Cir 97, WD, 1945)

Commissions for Clinical Psychologists: Warrant officers and enlisted women, as well as enlisted men, who are qualified as clinical psychologists, may now be appointed as second lieutenants. (See I, Cir 97, WD, 1945)

New Covers for Service Records: When a service record cover becomes badly worn or damaged, it has been common practice to detach the cover from an unused record to provide a replacement. See V, Cir 95, WD, 1945, directs that this practice cease. Replacement service record covers, WD AGO Form 24-C, will be utilized. Every precaution must be taken to see that entries and data contained on the service record are transposed correctly from the old cover to the replacement cover.

Efficiency Reports: Officers' efficiency reports are considered confidential in nature and should be so handled, but it is not the intent of the War Department that individual reports be so classified, except when the report actually contains information that requires proper classification. (AAF Ltr 35-208, 23 April 1945)

Personal Relationships: The fact that a member of the Army Nurse Corps, Women's Army Corps, American Red Cross, United Service Organizations, or a civilian is a blood relative of, or marries, a member of the armed forces or a WD civilian employee in an overseas theater base, or command, will not be allowed to effect an advantage or disadvantage in the assignment or duty of either person, nor will it be allowed to preclude the privileges normally allowed to such persons. Assignments of personnel under military control to duty overseas and authorization for others to proceed will be made solely on the basis of military necessity and without regard to the personal relationships involved. (See II, Cir 125, WD, 1945)

Wearing the Uniform After Discharge: Any person who has been honorably discharged from the Army may wear his uniform from the place of his discharge to his home, within three months after the date of such discharge. All persons who have served honorably in the Army during war shall, when not in active service, be entitled to bear the official title and upon occasions of ceremony, to wear the uniform of the highest grade held by them during their war service. Whenever the uniform is worn after discharge or separation from active service there is an obligation not to bring discredit upon the service. (See V, Cir 126, WD, 1945)

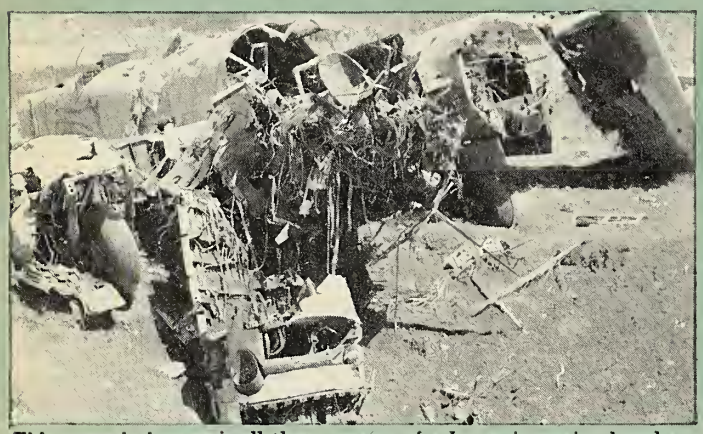
Unclaimed Personal Baggage: Large quantities of unclaimed personal baggage containing privately-owned and government-owned property are accumulating at railroad, bus, truck and express depots. Military personnel should promptly claim at the destination all personal property which they check or ship by common carrier. (See. I, Cir 61, WD, 1945)

Malaria Control: It is the responsibility of all commanders to initiate and enforce the necessary measures to control malaria within their units and unit areas. (AR 40-205 and AR 40-210)

Notice to Former Employer: When any member of the military service is relieved from active duty a postal card notice (WD AGO Form 519, Previous Employer Card) will be sent to the former employer that the ex-serviceman has been separated from the military service as of a definite date. The separation date for an officer will be the final date of such terminal leave as may be granted. (See VI, Cir 117, WD, 1945)

Mileage to Home: Where an officer upon being commissioned from an enlisted grade designated as his home the place where he was then serving rather than the place of his home of record, he may be considered as entitled, upon release from active duty, to mileage to his home of record, provided he certifies that he erroneously designated his duty station, or a nearby place, but that his home in fact was at the place stated in the certificate, and provided the place so stated agrees with his residence of record in the War Department as shown by his enlistment papers. (Par 15f, AR 35-4820, 19 April 1945)

Japs sounded fake alert and when American POWs took cover in this air raid shelter, the Japs poured gas in shelter, set it on fire.



This mangled mess is all that remains of a Jap twin-engine bomber.

Jungle Air Force B-24 lands on newly repaired Princesa airstrip.

GIs rest under wing of Jap fighter while building control tower.

Puerto Princesa, heavily-bombed capital of Palawan. At right is POW camp where 140 Americans were machine-gunned and burned.

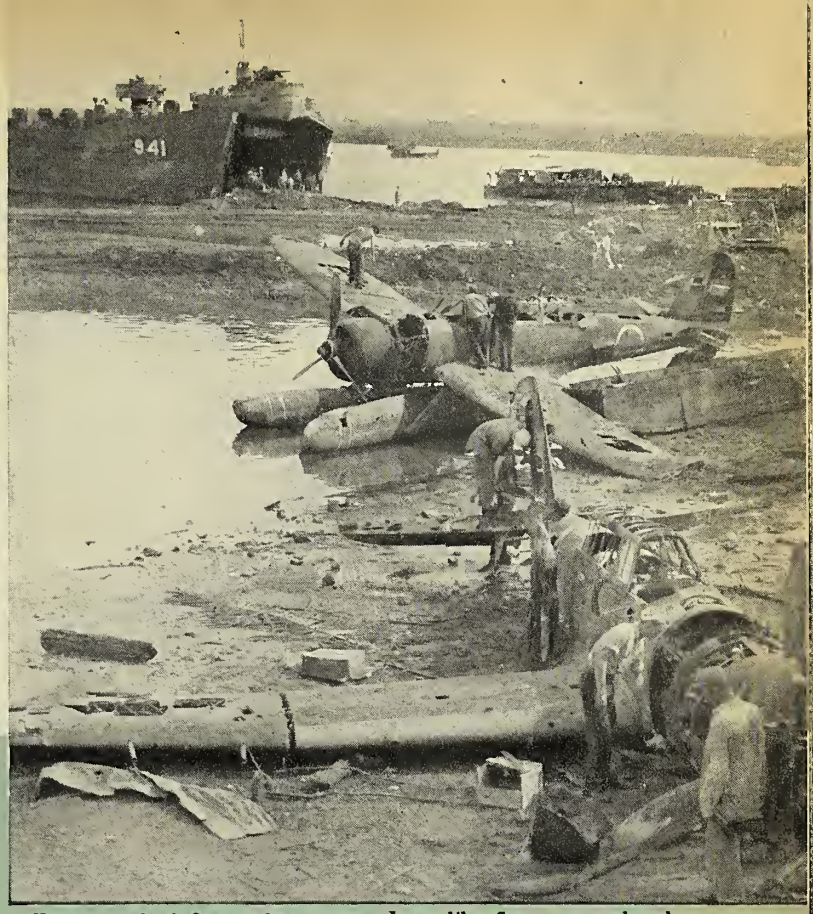
Palawa

When the time came to lock the door on Jap troop and supply movements in the South China Sea and provide a springboard for airpower in subsequent Borneo invasions, the key was the Philippine island of Palawan which points southward like a finger to the rich East Indies. "I don't want a single shot fired at the infantry when it goes ashore at Palawan," Maj. Gen. Paul B. Wurtsmith, CG of the 13th Air Force, told his staff. And not a shot was fired. Infantrymen of the 41st Division went ashore at Puerto Princesa almost unopposed. No men were lost on D-day. The Japs had fled to the hills.

This easy invasion of strategically important Palawan

Black Widow of 13th AF, one of the first arrivals, buzzes new strip.

This Jap, captured by U. S. infantry and guerrillas during fighting in Palawan's hill country, heads prisonward in back seat of L-5.



Two wrecked float planes, tossed up like flotsam on the shore of the harbor, are closely inspected by interested GIs and gobs.

ushover

was accomplished by air attacks that started early in October of 1944 when Army and Navy nuisance raiders paid occasional visits. The tempo was stepped up sharply near the end of the month when 37 heavies plastered Puerto Princesa airdrome, destroying 23 parked aircraft and damaging 15 others. The Jap garrison never recovered from that raid and the 13th's bombers continued to give the area a once-over-lightly every time repairmen began filling in the craters. On November 29, Morotai-based P-38s of the 13th Fighter Command flew their first escort mission to Puerto Princesa, but there was no intereception, nor was there any on subsequent missions. The final phase of the softening-up was staged from Mindoro with both fighters and bombers of the 5th Air Force blasting the area with bomb and strafing runs.

A sustained three-day attack preceded the February 28 landing.

The devastated facilities found by infantrymen—buildings, runways, revetments, aircraft—were convincing proof of the effectiveness of the pre-invasion attacks. The concrete runway was spotted with 182 bomb craters. Eighteen other craters had taken care of the overruns. The bombing results looked good to everyone but the aviation engineers, who had to put the strip back into service. ☆

This Nip sign had no effect on U. S. troops that took over field.

Japs turned this cathedral into military garage which was bombed by 13th AF. Pilots donated 2,000 pesos for rebuilding church.

OUR PACIFIC AIRFIELDS

(Continued from Page 13)

and Army ground forces have landed, the ships come up to find that there are no port facilities. The boats stay 1,000 yards off-shore while AAF aviation engineers build causeways, or float in their equipment, or waterproof their mobile units so they can be driven to the shore. Once on the beach, the 15-ton tractors and bulldozers bog down in the soft sand until roads can be constructed. Then, when the engineers have one foot on land and one foot still on the ships, an air alert is sounded, the boats pull away, and part of the equipment is on the island while the other part is still unloaded.

While that problem is being solved, careful surveys of the land are made to decide where the runways should go, to find enough coral and rock for paving purposes, and to select sites for permanent housing facilities. Usually, few maps are available and, as we move northward, no friendly natives. And all work is carried out under intense enemy resistance in the form of land attacks, suicidal forays, and continuous night air assaults.

The job of hacking out the airfield is then begun. Large warehouses, shops, depots, and hangars are built as well as storage tanks for aviation gasoline, and facilities for electric power, water distillation and food refrigeration. A modern city must be erected.

Trained personnel to do this work are not in the surplus category. When an invasion is planned, only a definite amount of shipping space is made available for ground forces, service forces, and supplies, and there is never too much of anything. From 1,500 to 5,000 men are needed to handle the construction of an airfield, depending upon its size and the amount of time available to finish the job.

It is a revealing fact that more men worked on the airfields of Okinawa than worked on all the airfields in France and Germany put together.

To construct an airbase on island X, about four months of back-breaking labor is required. Then, the AAF aviation engineers move to another island and the whole procedure starts all over again. Two hundred thousand more tons are hauled from California; a large-scale amphibious operation is undertaken; casualties mount; tractors broach on the beach; and there is always another and tougher operation lying just ahead.

The problem of building airfields in China is even more difficult. On the Pacific islands there is sufficient coral to provide a firm base for the runways. No such material is available in most parts of China. There, the AAF aviation engineers have to use gravel or scrounge around until a rock quarry is found. Sometimes they have to drain rice paddies and haul rock for many miles over what pass as poor excuses for roads.

It would appear that the tremendous "rice powered" labor supply of China would help solve the construction problem. Such is not the case. Due to the inability of the coolies to operate the highly technical machinery involved, this vast labor pool cannot always be used, since speed is so essential that only heavy construction equipment can complete the job in the short time available.

Further complications exist in China. The large Japanese army is a constant threat to the safety of the airfields. On the Pacific islands, once the existing enemy garrison is cleared out, our air and naval power can assure security from land attack. In China, the Japs captured some of our bases and are still quite capable of making serious attacks against others.

To get away from hypothetical situations and into actuality, consider the problems which existed when the AAF aviation engineers built airstrips in the Philippines and on Saipan. At Tacloban, on Leyte, they found a field 4,300 feet long by 100 feet wide, consisting of coral on a sand strip that could not be extended. The taxiways, such as existed, were made out of sandy loam intertwined with bamboo or just plain sand loam, too soft and narrow for our use.

The engineers practically had to pick up the airstrip and move it to another spot. They changed the longitudinal axis of the original strip 150 feet to the west and altered its direction. This provided ample distance for the necessary enlargement to 7,000 feet. Then they built a diagonal apron 2,400 feet by 200 feet. The field was in operation within 8 days. They had moved 161,619 cubic yards of earth and hauled coral over a distance of two miles.

For one fighter field on Saipan, they had to extend the existing runway by 800 feet, clear an additional 400-foot zone, and build two 75-foot shoulders. All of this was done in 10 days under conditions which could not be described as pleasant. Then, heavy bomber strips were prepared, including warm up and service aprons. The magnitude of the job on Saipan is shown by the fact that one field has seven miles of runway while another has a 450,000 square-foot warm up apron. In four and a half months, a single aviation engineer battalion quarried, hauled two and a half miles, and placed 426,850 cubic yards of coral on the runway, and excavated, moved, and placed 488,890 cubic yards of rock and earth. The amount of surfaces paved by the aviation engineers on Saipan would be equivalent to a two-lane highway from Washington to New York. Since 1941, the AAF aviation engineers have paved 838,000,000 square feet of surface, or enough to pave a two-lane highway almost halfway around the world.

On Iwo and Okinawa, and on every land area to be invaded on the route to Tokyo, the job gets tougher, the pressure greater, the time shorter. So, if someone starts yapping about how quickly we're going to wallop Japan, you can point out, among other things, the enormous problem of getting enough airfields to park our planes. Of course, the job will be done, sooner than later, but a lot of sweating comes first, considerable planning, a great amount of doing, and too much dying. ☆

ASK THEM ANOTHER

(Continued from Page 34)

the airfields. Engine life in the command was increased at least 50 percent.

Operations analysts assigned to the 20th Air Force are currently struggling with some 40 different subjects. One of them, referred to earlier in this article, has to do with devising defensive firepower formations for the VLRs.

Within the continental air forces, the analysts are chiefly concerned with developing new training techniques. These domestic sections are manned principally by professional educators, including two deans of university education schools. A small OAS is also assigned to the AAF School in Orlando, Florida. Col. H. W. Holden, school commandant, says the analysts are "a sort of cross between trouble shooters and efficiency experts. They know more about this school and every course in it than anyone at the school, including me."

Some commanders prefer to have their OAS chiefs take commissions—as in the case of Lt. Col. Sidney K. Wolf of FEAF, who came to the AAF through the Yale Engineering faculty, Western Electric and the War Production Board. But there are definite advantages in civilian status for most analysts. For one thing, it puts them on an effective working basis with either enlisted men or general officers. The gunnery sergeant can and does talk freely with them. And in talking to the CO, they are in a position to express their opinions without embarrassment. Then again, civilian status admits to this work some of the professorial talent who would have difficulties with an Army physical. And it permits the analysts to be retained for this type of work rather than diverted to other Army assignments.

Combat theater regulations require the OAS men to wear the Army uniform—but without insignia, of course. This not infrequently is the source of brushes with MPs and the Shore Patrol, generally beginning with: "What the hell kind of uniform is that?" Then too, they are often mistaken for correspondents, USO members, and assorted feather-merchants. One scholarly OAS chief says the subtlest flattery he ever received came from a sergeant who asked, "What instrument do you play, bub?"

As an operations analyst for nearly three years (including tours as chief of both the 13th and 20th Air Force OAS), Dr. Robert L. Stearns, president of the University of Colorado, has had more than his share of misunderstandings growing out of his brassless uniform. "I walked into the officers' shack on one steaming Pacific island shortly after I arrived," he relates. "As soon as I entered, an aggressive looking Marine officer descended upon me.

" 'Are you a civilian?' he bellowed. There was something about the abruptness of the question that angered me and I decided to have it out, once and for all. So I drew myself up to all of my five feet eight and said: 'Yes, goddamit, I'm a civilian. Want to make something of it?'

" 'No offense, my friend,' said the Marine. 'I haven't seen a civilian in 18 months and I just wanted to touch you.' " ☆

BLANKET OF FIRE

(Continued from Page 8)

staff cars and trucks were destroyed along with food, supplies and ammunition still serviceable and found abandoned by the enemy in his flight to safety. In addition, approximately 75 to 100 caves, some of which were known to have contained Nips and guns, were sealed by bombs. Since our last strike enemy resistance has been negligible as our forces continue moving forward."

Obviously saturation firebombing was an even more effective tactic than we had hoped. It was a new weapon. It could do a job that frags and demos, no matter what their size and number, could not.

Quickly following up the success of our first strike series we moved our targets ahead to keep up with the advancing ground forces. Four fire bomb strikes were scheduled for three target areas in the Mariquina Bosoboso River sector where the Japs had dug in for a determined and effective resistance. The four-day air intent called for the fighters to hit three targets, returning to target No. 1 on the fourth day. Approximately 200 P-38s and P-47s carried the fire bombs while P-51s administered the frag bomb and strafing followups.

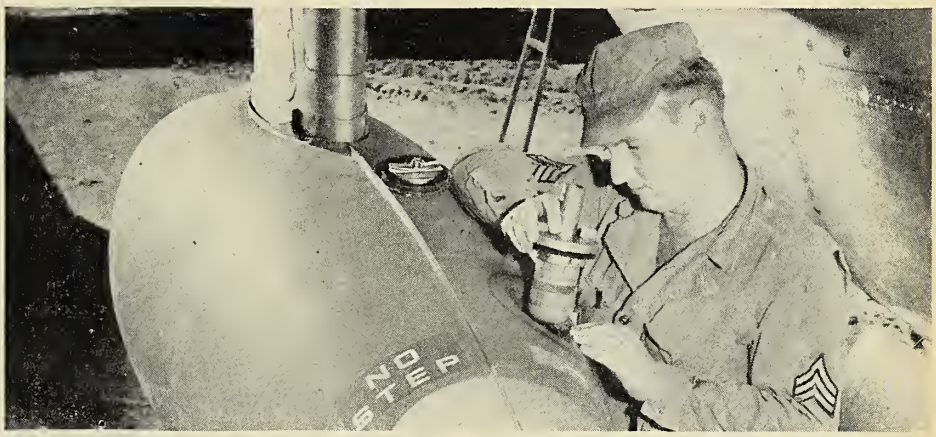
Results were even better than those of the first series. The first day's operations put us three days ahead of schedule since the infantry was able to move into targets one and two immediately despite the fact that we had planned a return engagement. This gave us a chance to set up two new targets, Nos. 4 and 5, for three succeeding days. On the four-day action the SAP reported: "In the 38th Division area: Following closely behind our strikes the troops captured with negligible resistance areas struck (targets included areas which the troops had been attacking for five to seven days, meeting stiff resistance with little advancing). All targets hit have been consolidated to date. The areas division stated they had counted 600 to 700 Nips dead in their area killed by air action and artillery, with ammo, gas, food and supplies in flames."

Scheduling the third in our series of mass fire bomb strikes, we felt confident enough to guarantee results. This was a two-day, four-group attack on troops of the Jap's 10th division established in strong positions along the Villa Verde Trail in Balete Pass. The fire bomb treatment was thoroughly administered and all targets were immediately overrun by the infantry. The Villa Verde Trail was opened and Highway 5 was consolidated through Santa Fe.

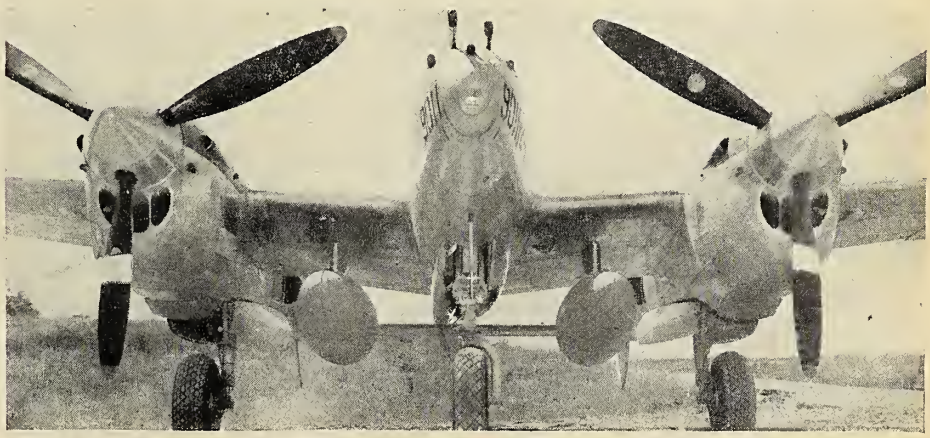
It is my belief that in the fighter-administered fire bomb treatment we have an extremely potent weapon. I believe you will be hearing a great deal more about it in the near future. This belief is shared by men in the ground forces, men who have been directly affected by the results. This message which came to us after the Ipo strikes illustrates the point: "My heartfelt thanks to you and your airmen for their splendid support of our attack on Ipo which made possible the early capture of the vital Ipo Dam." It was signed by General Krueger, commanding general of the 6th Army. ☆

These droppable tanks with 110-gallon capacity are shown being filled with fire jelly.

When tank is dropped it ignites highly inflammable mixture of jelly which spreads like lava.



Detonator fits into gas cap hole, has small fuze that explodes upon impact, firing jelly.



This P-38 is all set to drop 330-gallons of flaming jelly which is almost non-extinguishable.

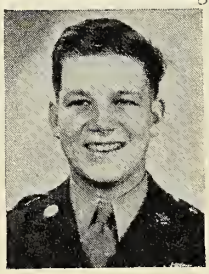
The Intercom

As a medium for the exchange of ideas, AIR FORCE presents these answers to its Question of the Month. Replies are those of personnel recently returned from combat duty in the areas indicated.

QUESTION: If you had your choice, what would you have ordered for your first meal when you returned to the United States?

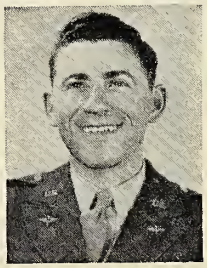
Sgt. William R. Schofield, gunner, 15th Air Force: "Steak and potatoes—the good old American dish. First, I would like some vegetable soup made out of vegetables from our own garden. Then the steak with white potatoes and peas and Jersey tomatoes. I would order some cranberry sauce made from cranberries grown in my native state of New Jersey. Follow that up with ice cream and I'm not particular about what kind of ice cream. A cup of real coffee and then I could go to sleep for a week. We got some good steak when I was overseas. But I'd like to have more."

Sgt. Charles A. Buckley, gunner, 8th Air Force: "Steak. A big juicy steak with plenty of French fried potatoes. Some peas, Lima beans, and a heaping helping of apple pie. Actually, I got steak for my first meal in this country when I reported to Camp Kilmer. Then when I went home I had just the same kind of meal as the one I ordered here. One other thing—around my home town of Woodstown, N. J., we grow a lot of corn. I think I would like to have some good Jersey corn on the cob. That's almost more than I can eat but I certainly would try."



1st Lt. Irving Herberg, navigator, 15th Air Force: "Steak for the main course. I would start off with some of my mother's noodle soup. Then a thick steak with some baked Idaho potatoes and a green vegetable. It really doesn't make any difference what kind of vegetable just as long as it's green. For dessert, I would like some jello with fruit mixed into it. And don't forget the milk. We never got any milk overseas — not even powdered milk. For second helpings, I would order some roast beef, well done. I haven't stopped being hungry since I've come back from overseas."

1st Lt. Frederic Wolkoff, radio specialist, 20th Air Force: "Ice cream and milk. I went into a restaurant and the waitress asked me what I wanted for the first course. I said 'Vanilla ice cream.' Then she wanted to know what I wanted for the main course. I replied, 'Strawberry ice cream.' For dessert, I ordered more ice cream and a quart of milk. I eat ice cream and drink milk whenever I get a chance. Solid food is all right, but when you haven't seen ice cream or milk for a long time, you just can't get enough of it. I'm going to try all the ice cream flavors I can think of."



Cpl. Solomon Mendelson, clerk, 6th Air Force: "Southern fried chicken. To start with, I would like some chicken soup with dumplings. Then tasty southern fried chicken with candied yams. I come from Cleveland, so I would order some of those delicious tomatoes they grow around there. For dessert, my order would be a big piece of lemon meringue pie and American coffee. Top that off with some Ohio wine, and there's a meal fit for a king. And tell the waitress to keep bringing the milk until I start floating in it. And some ice cream on top of that pie is a good idea."

Sgt. Eugene Fitzgibbons, radio operator, 10th Air Force: "I come from Canada and they are great beef eaters up there, so I would order roast beef. Then I would want some asparagus with hollandaise sauce, mashed potatoes and some green peas. Some sort of a green salad would be a good idea. Then some apple pie a la mode and a cup of American coffee—without chicory. I'm not sure I would know what coffee without chicory tastes like, but I am willing to find out. And lots of milk. I didn't even see any milk for two and a half years. I'll never get enough of it."

REDEPLOYMENT

(Continued from Page 22)

apply alike to officers and enlisted men? Generally, yes. However, in the case of an officer returning as a casual or as a member of a unit scheduled for inactivation, a certified copy of the officer's Form 66-2 is forwarded from the theater to Headquarters AAF, and by the time the officer arrives at a reception station, orders have been issued either separating him from the service or transferring him to redistribution station (after RR&R) for reassignment.

16. Might there be instances in which these procedures will be varied? Yes. If military necessity requires, officers and enlisted men in some critical specialties may go direct to continental assignments from reception stations instead of being sent to redistribution stations. However, all efforts will be made to see that all individuals redeployed to or through the United States get their RR&R.

17. Does this procedure apply alike to ground and flying personnel? Yes.

18. Are redeployment policies the same for all three major Army forces? Yes, but there are essential and important differences in the application of these policies. Basic policies applying to all Army forces have been stated by the War Department in the well known RR series. (War Department Readjustment Regulations). While these policies apply throughout the Army, it is recognized that there are problems which, for example, are peculiar to the AAF and require special handling. Therefore, in some of the details but not in the basic policies the procedures vary among the major forces of the Army.

19. How long might an essential enlisted man eligible for release on the basis of points be retained in the service? This cannot be answered conclusively. However, it is the intention of the AAF that every enlisted man having the necessary score and desiring release be separated before the end of the so-called readjustment period, meaning 12 to 15 months after the fall of Germany. This depends not only upon the retraining program but also upon the availability of shipping from both active and inactive theaters.

20. At what rate does the AAF expect to release eligible personnel? It is expected that by late fall the separation rate will reach 40,000 a month. It is the aim of the AAF that except for a few in highly specialized skills, all eligible enlisted personnel desiring release will be separated by the end of the first year after V-E day.

21. Has any authority been established to review the cases of enlisted men who are

Answers to "How Sharp Are You"

Photo on Page 2

1. Changing a propeller
2. B-25
3. No
4. None
5. Two

Questions on Page 43

6. True
7. Yes
8. Stinkey
9. 11th
10. True

eligible for release on the basis of ASR scores, but are retained for military necessity? Yes. Reviewing boards have been established to examine and decide on the cases of eligible personnel who are being retained in redeployed units by reason of military necessity. Boards will be established later to review cases of eligibles being retained at installations in the U. S. As necessary, similar reviewing authorities will be established in the aetive theaters to examine the cases of men who are retained as essential despite the availability of replacement personnel.

22. How many individuals is the AAF expected to get from Seleetive Service, Army Ground Forees and Army Service Forces to equalize the percentage of demobilization with the other forces? More than 200,000.

23. What statement may be made on the release of officers? Those having high ASR scores and desiring release will be the first to go. The exception is, of course, that those qualified for and classified in a specialty that is critically short cannot be released until replacements are available. Monthly quotas will be issued for officers which will specify the number in each command by MOS, grade and category to be released. Categories, determined by the combination of ASR score, desire for retention and efficiency index, are defined in AAF Letter 155-9. All individuals with high scores who desire release will be relieved ahead of those in the same specialties having low scores.

To the extent practicable, officers with low seores who have not previously served overseas will go to the active theaters to replace high score officers, the latter to be returned to the United States for determination of their essentiality and probable release if desired. Those who wish to be retained and are qualified will be retrained in speeialties that are critically short so that an equitable release of officers in these speeialties ean be effected.

There will be a very limited list of civilian and military specialties critically short in the Army as a whole. An officer in one of these specialties may be surplus to the AAF. If so, he may be transferred to another branch of the Army as directed by the War Department. Lists of these specialties will be published from time to time.

24. For officers, what are considered "high" point scores? Captain through colonel, 70 and above; first lieutenant, 58 and above; second lieutenant, 42 and above; flight officer, 36 and above; warrant officer, 65 and above.

25. To what extent do point scores and efficiency indices control the release of officers? The basic consideration in releasing officers is military necessity. This means real military necessity and should not be construed to mean military convenience. Military necessity is not to be invoked unless an officer's MOS appears on the Army or AAF critical shortage list. Officers desiring release who are found to be nonessential will be released. But where a choice must be made between two officers, the one with the higher score and the lower efficiency index will be released. ☆

A YANK for Good Measure

Take a look at his scoreboard.

Kit Curdes was circling low over one of his P-51 pilots who was bobbing in his dinghy just off Jap-held Batan Island. Another pilot whose plane had the lowest gas supply had high-tailed it home for a Cat. A fourth was circling at 20,000 feet, giving out with a distress signal.

It had been a fairly good day, as fighter mission days over Formosa go. Curdes' flight had knocked down two planes over the target, Curdes getting his first Nip since he came to the Pacific from the MTO last December. They had blasted three more on the ground at Batan before flak caught one of his flight.

Curdes looked down at the tossing dinghy and figured the chances of a Catalina coming in for a rescue before dark. It was getting along towards mid-afternoon, and the nights come fairly early off northern Luzon in the middle of February.

Suddenly, Curdes noticed a black speck coming from the southwest toward a Jap landing strip on Batan; then the speck became a dead ringer for a C-47 and as the wheels came down on the transport Curdes saw the American markings.

"Those damned Japs have patched up one of our buggies and didn't even have the grace to take the markings off," Curdes figured as he wheeled about to give the visitor a closer look.

Then he read a familiar number on the tail. It was the number of one of the "Jungle Skippers." At this point, the Jap ack-ack opened up—at Curdes' P-51 but not at the transport. A quick run of thinking convinced Curdes there was only one thing to do since the plane would be Jap property as soon as it landed, if it was not already.

The P-51 banked steeply, head-on into the flak, and opened up with its fifties on the C-47's right engine. As the transport headed out to sea, with one engine gone, Curdes made a 180-degree turn and cut loose on the other engine. The 47 settled into the water within yards of the downed fighter pilot's dinghy.

Curdes dived in to do a little strafing after all occupants of the transport climbed aboard life rafts, but he observed in time that the survivors were white. So he went back to his low-level circling. His water-bound charges had grown from one to thirteen.

When darkness fell and still no help had arrived, Curdes figured all hands would be safe until dawn and returned to his base. The next morning before daylight, he and his wingman took off, and they were circling over the survivors when a rescue Catalina arrived to pick them up.

Back at base, Curdes learned that the C-47 had been American manned, with 12 occupants including two Army nurses. The pilot had become lost during a flight from an island in the southern Philippines and had been forced to head for the nearest visible strip because of fuel shortage.

Curdes gave a start and a shout when he glanced at the names of the survivors. One of the nurses was the "date" he had been forced to break—without notification—the night before at Lingayen.

"Jeepers," he exclaimed, "Seven 109s and one Macchi in North Africa, one Jap and one Yank in the Pacific—and to top it, I have to go out and shoot down the girl friend."

A few weeks later, Capt. Louis E. Curdes of the 3rd Air Commando Group was awarded the Distinguished Flying Cross for shooting down a C-47. ☆

SHOOTING THE BREEZE

GOT ANY GOOD STORIES? SEND 'EM IN!

Never Never Land. "There are many and diverse ways the top can be blown in this man's army," a civilian visiting AIR FORCE said the other day. This civilian, who was a master sergeant just 24 hours before he came in, had returned from the separation center at Fort Dix to show off his blue pinstripe suit and flowered necktie.

"I'm talking with this guy for a couple of days while we're waiting to be discharged," the visitor said. "We get all set to sweat out the last sweat. We turn in all our stuff, listen to the lectures, and just take it easy. Then I notice the guy is getting nervous. We're waiting for our names to be called—just a few more hours in the army. They call for me, and later I hear them bellowing for this guy. Then comes the screwiest thing I've seen in four years of the army. They can't find this joker anywhere. The day they want to discharge him—he goes AWOL."

U. S. A. Capt. Edward J. Sawberger, awaiting reassignment at Army Air Forces Redistribution Station No. 2 in Miami Beach, was describing how his Liberator made a crash landing last November on the Isle of Vis in the Adriatic Sea.

"Anybody hurt?" he was asked.

"Two fellows," he said. "The nose gunner hurt his nose, and a waist gunner got a bruise on his stomach."

"By any chance, did the. . . .?"

"No," interrupted the 22-year-old pilot, "the tail gunner was not injured."

South America. The colonel was a lover of beauty. A waving flight of butterflies filled him with inexpressible joy, and he felt that each nodding flower was a bright companion. He liked nature unspoiled. The GIs didn't much care, one way or the other. But fences began to crop up everywhere. The landscaping was protected by wire. The greensward was roped off. Short cuts across grassy patches were out of bounds. Then a USO group came to the station and the soldiers decided to have their revenge. After all, you can't bust a USO pianist down to a piccolo. The theater was jammed to capacity and the Old Man had just made himself comfortable in his reserved seat. The house lights were dimmed, then a spotlight picked out the colonel. The band struck up the first note and a pleading voice wailed through the long, torturous length of "Don't Fence Me In."

Guam. A 21st Bomber Command clerk has been given up as an incurable gambler. If he comes to no good end, then that is how it must be. The young man plays a dull, uninspired type of poker and has lost most of his pay through this method since the day of induction. The guy has become a squadron joke. Recently, after being cleaned out, he appealed to his chaplain.

"You get no sympathy from me," said the chaplain, long acquainted with the man. "You can't win in a fair and honest game—then why did you play with those sharpies down at the motor pool? You must have known you couldn't win there."

"I did," the clerk whined sadly. "But what was I to do? It was the only game I could find."

Leyte. A 30-day supply of apricots accompanied the air task force which operated on this island in the early days of its liberation. Logistically, that is a minor triumph in itself. By any standard it is a batch of apricots. Apparently it had never occurred to the supply officer that there are such things as pineapple, peaches, fruit salad, pears and prunes. When he thought of fruit, he thought of canned apricots.

After two weeks the task force hated apricots with the same spirit they hated Japs. One red-haired corporal was particularly bitter. Even as a child, he wailed, he had despised apricots. Three times a day the chow line rang with his denunciations. Between meals he criticized the judgment which had caused the apricots. Then, just at breakfast time one morning, the Japs came over, strafing the chow line, sending the men to whatever shelter they could find. When it was over the shrill voice of the corporal was heard behind some packing cases. He was madder than before, and his raving was more bitter than ever. The packing cases had been riddled, but he had escaped bodily injury. He was, however, soaked from head to foot in apricot juice.

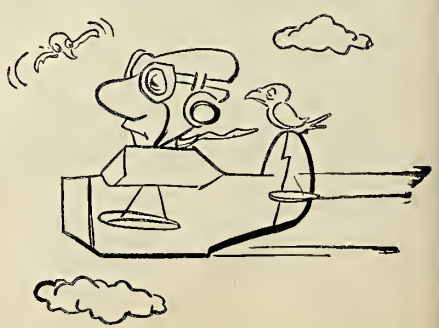
Pacific. Shaking a half dollar out of a coke bottle, T/Sgt. Vernon Black looked casually at the startled airmen around him. He rubbed his hands together and thick puffs of smoke burst forth.

"These little accomplishments could come in handy," Black said solemnly. "I'm glad I spent my spare time back in the States learning magic." With a quick flick of the hand he removed an egg from behind a gunner's ear.

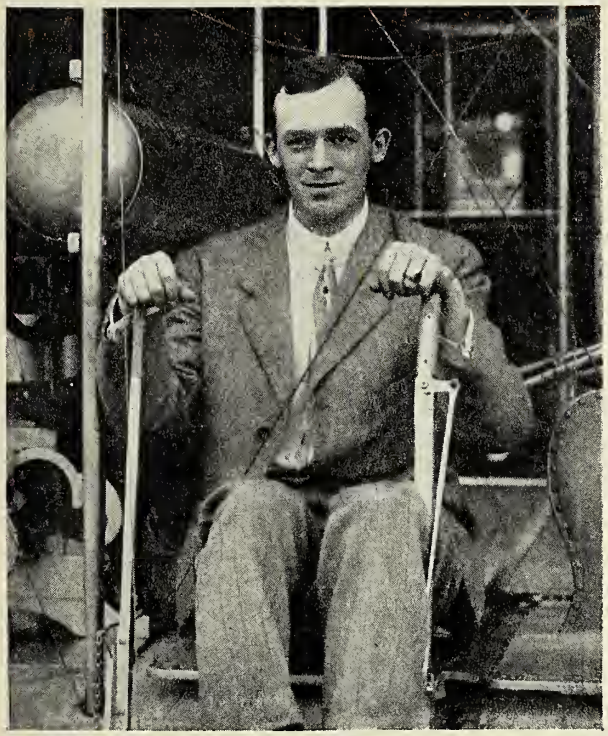
"I might even become king of a native tribe with a trick like this," Black said. He took another egg from the bewildered gunner's ear. "Just in case I get forced down," he explained.

Black dropped the half dollar back into the coke bottle and went to unpack his gear. He had just arrived for combat in the Pacific.

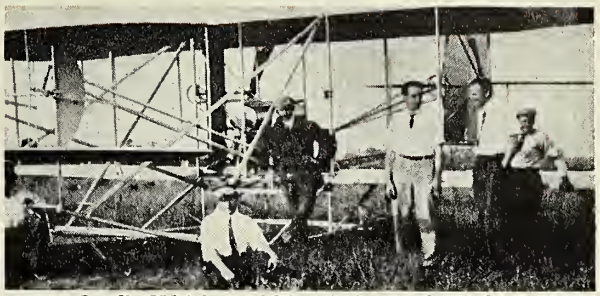
Luke Field. Warrant Officer Rex Swindling says that airmen seem to have a never ending stream of questions when they call at the local finance office. About the dumbest question to date, and certainly the most sensible answer, occurred when a new brass hat asked Cpl. Pete Jackson if Link Trainer time counted for flying pay. Without blinking an eye, the patient Jackson replied, "Well, sir, if you can get the damn thing off the ground—we'll pay you for it." ☆



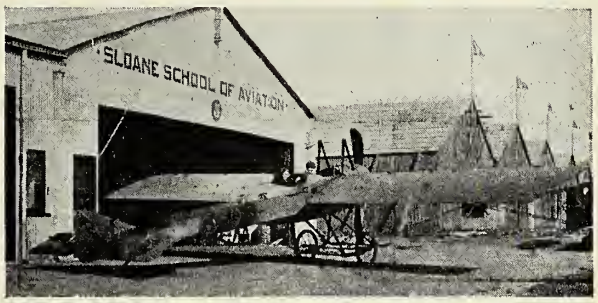
The Album — AVIATION CADETS



1911. This vaguely familiar chap, sitting at the controls of a Type B two-seater, is 25-year-old 2nd Lt. H. H. Arnold who is learning to fly at Wright Flying School, Dayton.

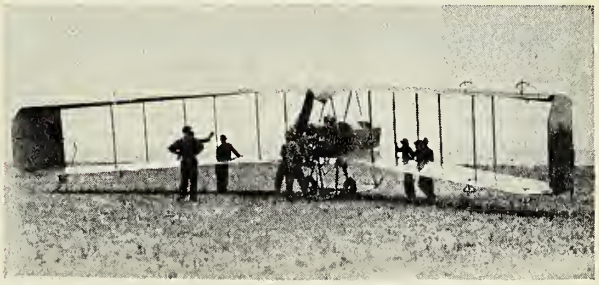


1910. Orville Wright and his aviation students drape themselves alluringly around a Wright plane at Montgomery, Ala.

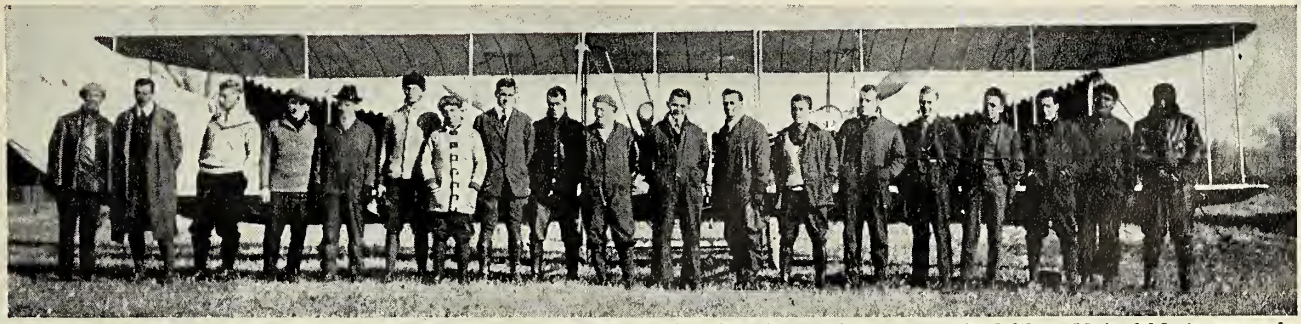


1913. In this biplace machine, instructor communicated with pupil by rapping him from behind with wrench.

1914. Hangars of first aviation school at San Diego, Cal. Hangars for seaplanes were located a short distance away.



1916. Ragtime mechs fuss with a Burgess-Deunne Tractor Trainer. Get a load of the swing-wings with the reet-seats.



1915. Student body of the Wright School at Augusta. As for uniformity of apparel, these guys look like a United Nations parade.

38 years of progress...AAF 1907-194

S.sew

WAR DEPARTMENT,
OFFICE OF THE CHIEF SIGNAL OFFICER,
WASHINGTON.

August 1, 1907

OFFICE MEMORANDUM.

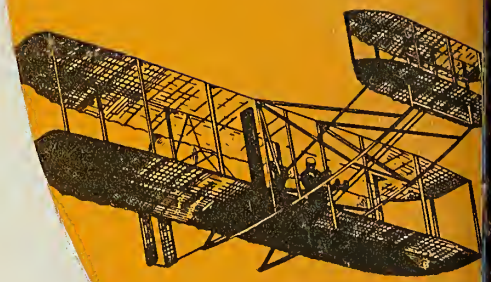
An Aeronautical Division of this office is hereby established, to take effect this date.

This division will have charge of all matters pertaining to military ballooning, air machines, and all kindred subjects. All data on hand will be carefully classified and plans perfected for future tests and experiments. The operations of this division are strictly confidential, and no information will be given out to any party except through the Chief Signal Officer of the Army or his authorized representative.

Captain Charles DeF. Chandler, Signal Corps, is detailed in charge of this division, and Corporal Edward Ward and First-Class Private Joseph E. Barrett will report to Captain Chandler for duty in this division under his immediate direction.

JAMES ALLEN,
Brigadier General,
Chief Signal Officer of the Army.

...r Captain Chandler.



AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES ☆ SEPTEMBER 1945

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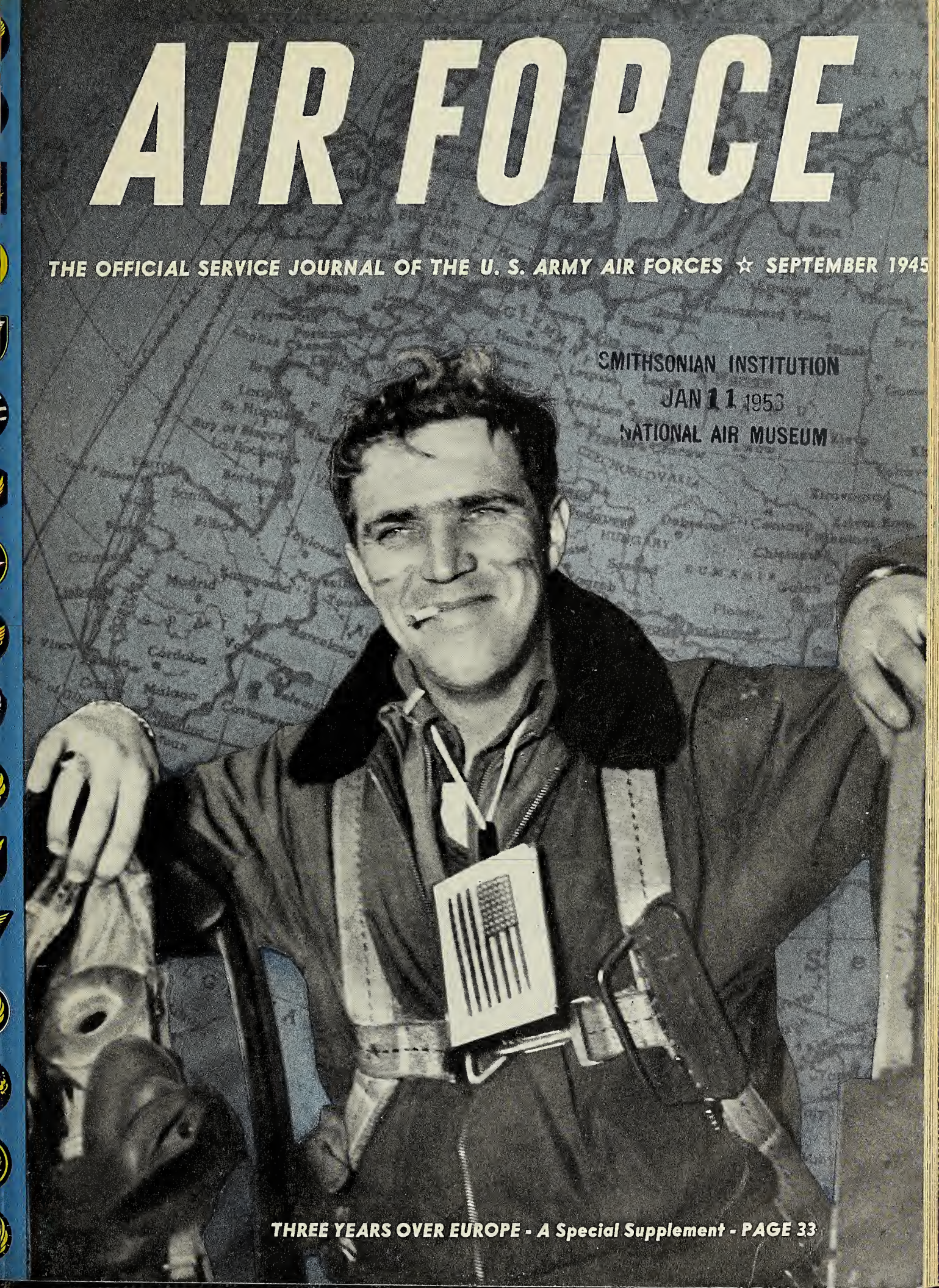

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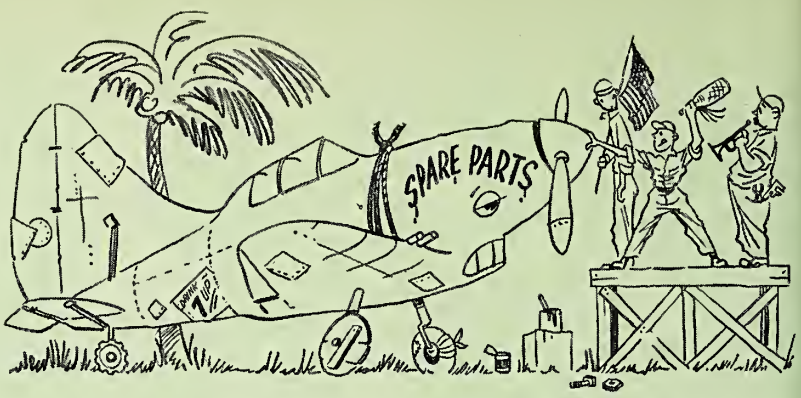
"I'll bet I get a nice boost for this magnetic nail sweeper."



"Not too hard, Seymour."

G.I. INGENUITY

BY CAPT. WM. T. LENT
AIR FORCE Staff

"Five mallards at 10 o'clock high."

"Dammit! I told you to leave him at home when you're working on the line!"

"How's about giving a little thought to my pinups, now!"

To All Personnel of the Army Air Forces:

A few days before Japan's surrender, a B-29 Superfortress dropped the world's first atomic bomb on Hiroshima.

And yet, in the larger sense, that one atomic bomb was not dropped by one B-29 and its lone crew. All those who have heroically given their lives to the AAF, every man and woman now in its service and all who have returned to civilian life—all participated in the dropping of that bomb. The crew of the B-29 was comprised of the thousands of crews that have flown for almost four years through flak and the fury of enemy fighters over Europe, Italy, Africa, China and throughout the Pacific from Moresby to the Marianas.

Its ground crew is not stationed on one Pacific island alone but is with the Occupation Air Force, at every AAF base from Kansas to Karachi to Kwajalein.

The strip on Guam from which it took off is the sum total of the thousands of strips built by our aviation engineers from pastoral England to the wilderness of New Guinea. It was serviced by the millions of men who have worked in the deserts and jungles and in the northern outposts of Greenland, Iceland, the Aleutians.

You are the AAF, the life and blood of American airpower. The war against the Axis is over and yet we have two missions to fulfill. To maintain order and safeguard the accomplishments of victory, it will be necessary that adequate numbers of AAF personnel continue to serve in the occupation and other air forces. There must be an orderly transition to peace-time conditions. And further in the future, the AAF must recognize its responsibilities as an effective instrument of peace. This is a challenge that I know the AAF will accept, not as a duty but as a privilege.

The Wings of Victory are yours. Wear them proudly.

H. H. ARNOLD,
COMMANDING GENERAL
ARMY AIR FORCES

Vol. 28 No. 9 September 1945

AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

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Rendezvous

Degree of Ruggedness

Dear Editor:

After reading "They've Got You Covered" by Sgt. Louis W. Davis (March AIR FORCE), I've come to the conclusion that whoever captioned the picture of Tingkawk Sakan control tower on Page 59 as "rugged" would be interested to know that the big super job was the second one. Those sticks appearing as a "H" in the center of the

picture were on the tower for a good many weeks until the very busy engineers had time to push the jungle back to build the "rugged" one.

S/Sgt. Arthur G. Meyer,
APO 218, c/o PM, New York City

Dear Editor:

I have read with interest the article "They've Got You Covered" by Sergeant Davis in the March 1945 issue. Hats off to Sergeant Davis of AACS for his interesting article on the fine work the AACS is doing, but I noticed one glaring omission in this saga of airways communications—he never mentioned the Army Communications Service of the Signal Corps.

True, in the early days of the war, this outfit was lacking in manpower and organization, but now we have grown up. . . .

S/Sgt. Charles J. Sloanmaker,
APO 629, c/o PM, New York City

Under varying and often exceedingly difficult conditions, AACS and ACS are both doing a real job. Sergeant Davis and AIR FORCE *doff their hats to you and ACS, too. —Ed.*

Farewell

Dear Editor:

With regard to my swan song, "Three Years Over Europe," (Page 33), which I understand you will run more or less intact in this issue, may I say that it has been probably the most gigantic brains-picking operation in the history of the AAF. My victims lie scattered from the Pentagon to Caserta, and from London to Leipzig, and without the eye-witness information they gave me and the reports they made available, the round-up could never even have been attempted.

It's probably unfair to single out any individuals, but many of the better ideas came from Lt. Cols. Bill Haines and Caleb Cof-

fin—both in England when I talked with them.

Any loud squawks from readers concerning glaring omissions or grievous errors you can refer to me. By that time I will be on terminal leave, and will not pay the slightest attention. Hail and farewell.

Maj. Arthur Gordon

To ex-staff member Gordon, any squawks occasioned by your magnificent "swan song" we will gladly absorb. May your years as MR. Gordon be long and prosperous.—Ed.

Glip Credit

Dear Editor:

The current issue of AIR FORCE carries an article on "Glip-Bombing" by the 341st Group of the 14th Air Force. The authorship of this article is incorrectly attributed to Lt. Col. George W. Taylor. The article was written jointly by Dr. Carl J. Rees and myself, Rees being senior author, I being junior. If there is any way that this can be corrected it would be appreciated.

We are very gratified with the excellent treatment you gave this article. The bomb group referred to has done a marvelous job and we are pleased to see them justly publicized.

Lt. Col. George W. Taylor,
APO 627, c/o PM, New York City

Dear Editor:

I was quite interested in the so-called "Glip-Bombing" article in the June edition of AIR FORCE. It is always great for morale when credit is given for an achievement that renders the prosecution of the war more efficient.

"Glip-Bombing" achieves the same purpose as glide bombing in that the impact angle of the bomb is sharp enough to afford penetration of the target without skipping.

The "Gomboy" Group was part of General Morse's Chinese-American Composite Wing stationed in China.

A squadron of this group was operating in Burma during June and July, at which time they used the "glip" or "glide" method of bombing against bridges with outstanding results. It was at this time that a member of the "Bridge Busters" obtained the technique when he visited the squadron.

This same technique was used by Maj. Raymond Hodges in his missions of November and December against a famous and tough bridge in China. He also achieved outstanding results with this same technique. . . .

I feel that this unit of the Chinese-American Composite Wing should be given the credit to which it is entitled.

Lt. Col. David J. Munson

Costs and Fuel Cocktails

Dear Editor:

We have been having a few arguments here lately which aren't being solved, so I thought you would put us straight.

First: the total cost for the construction and experiments of the original B-29.

Second: the results obtained when an equal amount of 100 octane aviation gasoline and 91 octane aviation gasoline are

(Continued on Page 73)

In This Issue

The weary but happy fighter pilot whose picture was selected for this month's front cover as representative of the human element in the AAF's "Three Years Over Europe" is Lt. Robert G. Young, Jr., P-51 pilot of the 8th Fighter Command. Although Young gave out with this grin when he climbed from the cockpit of his fighter after escorting his "big brothers" over Berlin several weeks before V-E day, his face seemed to us to reflect the feelings of hundreds of thousands of AAF airmen in the ETO when they knew on May 9, 1945, that their fighting job in Europe had come to a gloriously successful end.

Around Young's neck hangs a reproduction of the American flag to identify him to Soviet troops had he been forced down behind their lines which were at the outskirts of the Reich capital when this photograph was taken. On the reverse side of the tag is an inscription in Russian as an added identification precaution.

Young, whose wife lives at Midland Park, N. J., was a chemical laboratory assistant for the Merck Company, Rahway, N. J., in civilian life.

☆

Maj. Arthur Gordon's "Three Years Over Europe," the special supplement beginning on Page 33, is no mere summary or compilation of data relating to the AAF's role in the defeat of the European enemy. It is more an eye-witness story of AAF men and planes, and their gigantic accomplishment during the war years preceding the final collapse of Germany's military machine. Major Gordon, below, arrived in England in the fall of 1942, when our initial missions over the Continent were not yet a faint shadow of the mass attacks to come. During the ensuing months while serving successively as an intelligence officer, as chief of the Magazine Section, 8th Air Force PRO and later as European staff correspondent of AIR FORCE, Major Gordon participated in a number of combat missions both from England and Italy, for which he was awarded the Air Medal by General Spaatz. Returning to the States in July, 1944, Major Gordon became editorial director of AIR FORCE and continued in that capacity until he went back to Europe in April of this year "to be in on the finish."

In a foreword to "Three Years Over Europe," Major Gordon says its purpose is simply to help our airmen tell their stories better by giving them a broader picture of the whole AAF effort in the European conflict. We think you will find it does that—and more. Major Gordon refers to "Three Years Over Europe" as his "swan song," having gone on terminal leave—with well over 100 points—shortly after completing the article.

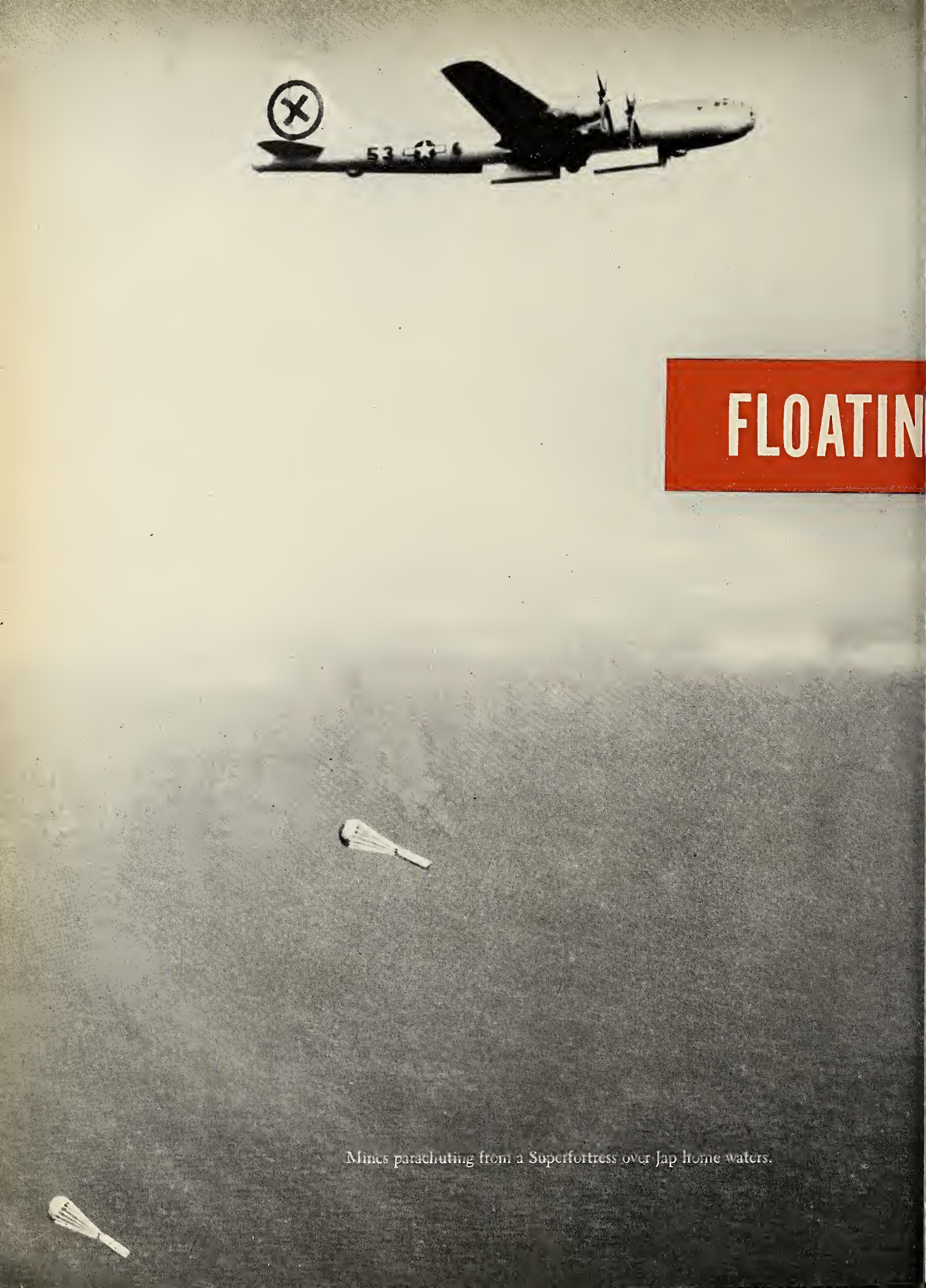
☆

Two other AIR FORCE staff holders of the Air Medal are represented in this issue—Maj. Milton R. Krims ("Floating Death," Page 4) and Capt. Eric Friedheim ("Welcome to Dulag Luft," Page 16). In the June issue we reported that Major Krims, our correspondent in the Marianas, had flown against all four major targets of the historic March 10-20 missions which introduced the Japs to low-level incendiary attacks by B-29s. For these and subsequent Superfortress missions flown before he reported to our Manila office, he was awarded the decoration by General LeMay, then in command of the 21st Bomber Command.

Captain Friedheim was awarded the medal after he had been forced to bail out of a flak-riddled C-46 behind the German lines during the airborne invasion of the Rhineland. Captain Friedheim, who told of his experience in his "Rhineland Rendezvous," published in the May issue of AIR FORCE, descended into the thick of battle and spent five days making his way back to his base. He has now returned to New York little the worse for wear.

☆

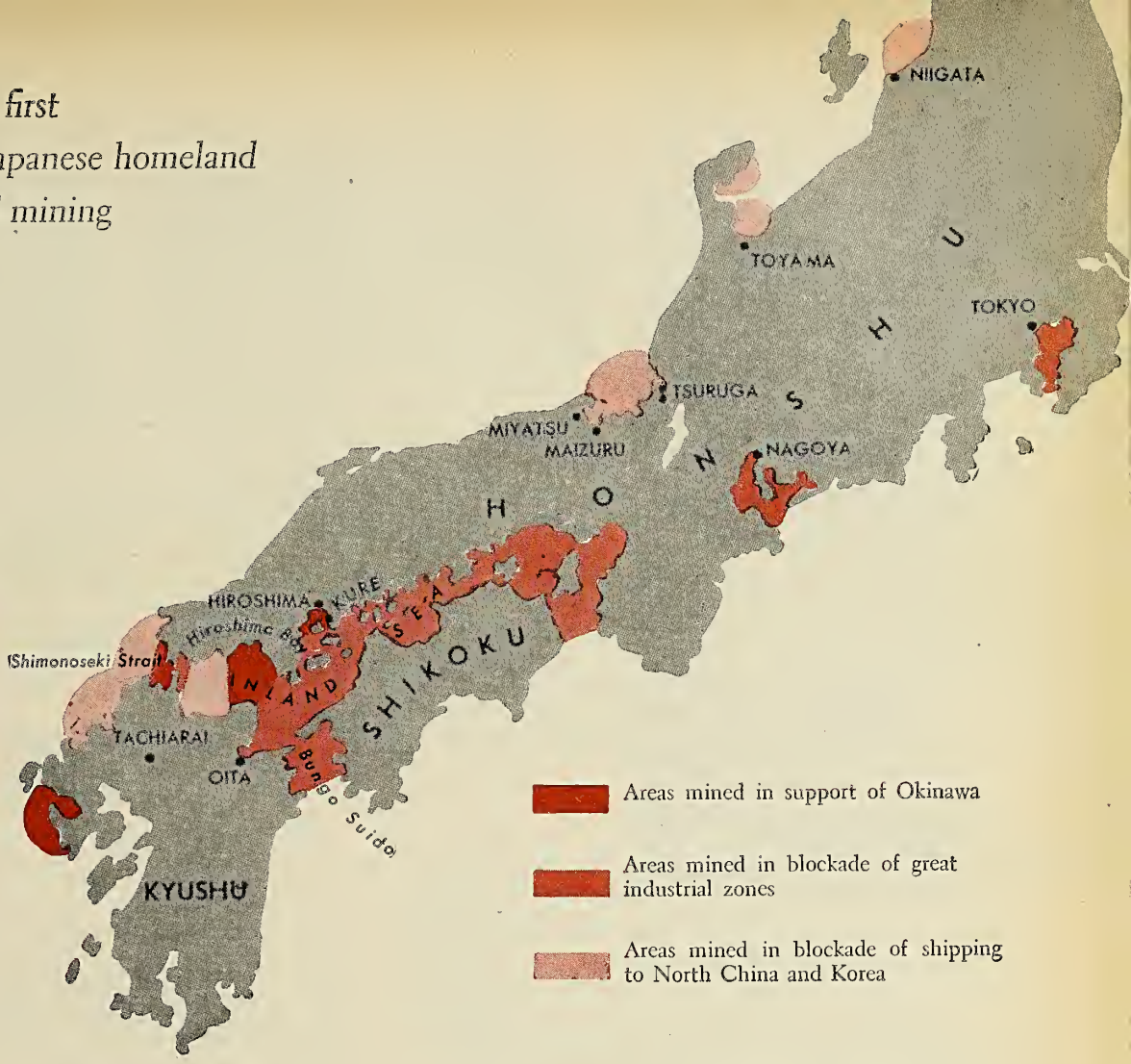
Basic material for "Air Disarmament, Germany" (Page 10) was compiled and forwarded to our New York office by Capt. Charles Cooke, AIR FORCE staff correspondent in Europe, and S/Sgt. Douglas J. Ingells, of our Wright Field staff. The finished product was put together by Cpl. Peter Baumann, our home office "Technique" specialist. Latest flash from AIR FORCE Far East Branch in Manila tells us that Maj. Ben Grant, former chief of our Washington office, has arrived for duty with Lt. Col. James H. Straubel, editor and director of AIR FORCE, Maj. Andrew R. Meyneke, distribution trouble-shooter, and Capt. Woodrow P. Wentzy, AIR FORCE's Manila production chief, who were already on the scene. ☆



Mines parachuting from a Superfortress over Jap home waters.

Our B-29s placed the first stranglehold on the Japanese homeland with the biggest aerial mining job in history

EATH



BY MAJ. MILTON R. KRIMS

AIR FORCE Overseas Staff

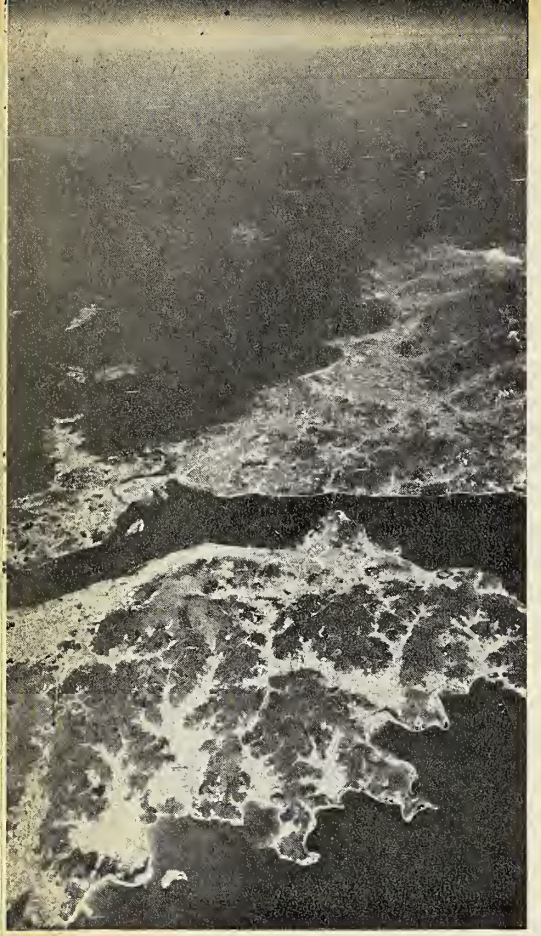
The green blue waters of Japan's Inland Sea are ominously quiet these days. Shipping clings timidly to the safety of harbors, naval units brood at anchorage. Occasionally a convoy of ships ventures into the open, forced by desperate necessity to trade heavy losses for anything left to deliver. The only shipping that plies back and forth in grim and sometimes suicidal parade consists mainly of minesweepers. And their work is never done. The mines keep bobbing back—from the air.

Not long ago, the Inland Sea was a very busy waterway; shipping from Korea, Formosa, the Philippines and North China poured through Bungo Suido and the narrow Shimonoseki Strait bringing food and raw materials to Japan's hungry people and hungrier factories. Even after the Philippines were lost and the war moved much closer home than the Japanese had anticipated, the Inland Sea was reasonably—if temporarily—invulnerable because it was an inner zone and protected from our submarines by an extensive network of minefields.

But as the strategic bombings of the 21st Bomber Command's B-29s gradually reduced the enemy's exterior ports, destroyed his stockpiles and forced dispersal of his factories, he became more than ever dependent on the supposed safety of the interior. His over-burdened railroads and highways forced him to turn increasingly to shipborne traffic on the Inland Sea. He was left with two entrances to the relatively safe sea, Shimonoseki Strait and Bungo Suido. Bungo Suido did not offer complete safety due to ever increasing American submarine action in the southern and eastern waters. But Shimonoseki seemed ideally situated; a narrow and well protected channel separating Honshu from Kyushu, it provided a safe entry for critically needed supplies from Korea, Formosa and North China. From a strict military standpoint, it also provided the safer of two exits for the Japanese fleet, hiding in the Inland Sea, when and if it decided to sortie against the U. S. Navy.

But the Japs were not alone in their regard for the war potential of the Inland Sea. Many Americans had been giving it much thought for a long time; our Board of Economic Warfare had certain ideas regarding its importance. Two men, one an ex-mathematical physicist from the Carnegie Institution of Washington and the other an ex-student of sales and industrial management from Ohio State, eventually had a chance to do more than think about it. They were Ellis A. Johnson, in the Navy, and George A. Grossman, in the Army. Today, Commander Johnson and Captain Grossman work together as mining officers for the 21st Bomber Command. It was inevitable they should combine forces.

Some seven years ago, the then Dr. Johnson was peacefully minding his own research business when a friend asked his help for one night on a mining problem at the Naval Ordnance Laboratory in Washington, D. C. Within several weeks, he was "helping out" seven days and seven nights a week. Soon he found himself a mining expert and



This high altitude reconnaissance photograph shows the narrow Shimonoseki Strait before it was mined from the air by B-29s.

in uniform. He was worrying about mines at Pearl Harbor the day the Japs made their first and last visit. He was mining officer aboard the Lexington and the Yorktown. He went through the First Battle of the Philippines, and the Palau raid. He had become one of the Navy's foremost mining experts. It was while serving aboard the Yorktown that he wrote his plan for mining the waters of Japan, especially the Inland Sea and, as suggested by BEW, the Shimonoseki Strait. He was sent back to Washington to discuss his plan and there, in due time, he met Captain Grossman.

Captain Grossman, a product of OCS, was originally an ordnance officer. Lt. Col. George Younger, in charge of Special Projects, OC&R, Hq AAF, had long believed in aerial mining, had sponsored the idea of sending young AAF officers to the Navy mining schools. Selected for training in this program, Grossman took courses at several Naval schools and became convinced of the potentialities of offensive aerial mining. Called upon to lecture at the first and only mining school in the AAF at the School of Applied Tactics, Orlando, Fla., he soon built his lectures from twenty minutes to six hours, and eventually was awarded the Legion of Merit for his outstanding work as an instructor. And luckily the course was at its best when the first B-29 crews attended the school as part of their overall training program. Convinced that the B-29 was the only airplane that could carry out his ideas for mining Japan, Grossman did all he could to convince the men of the 20th Air Force that mining was a practical offensive weapon.

There were a lot of established notions about mining. Although already used offensively by both the Germans and the British, mining was still considered by our forces to be a defensive weapon. There was plenty of knowledge about surface and undersea craft mining, very little about aerial mining. To create an effective plan called for a high degree of technical knowledge and to sell it called for real salesmanship. Working together, Johnson and Grossman made converts until finally, with their help, the 20th Air Force was persuaded to give mining a try.

The plan against Japan was divided into three phases: first, to interrupt shipping between ports of the Inland Sea, then to neutralize Japanese naval vessels lurking within the safety of the Inland Sea, and finally to throw a complete ring of mines all around the Japanese home islands. The plan called for the first determined attempt in history to impose a strategic sea blockade by aerial mining upon a maritime nation with the aim of preventing both external and internal shipborne commerce.

The team of Johnson and Grossman arrived at 21st Bomber Command headquarters in December of 1944 as mining officers charged with planning and setting up aerial mining operations against the Japanese homeland, these operations to commence April 1. They had no intelligence section, no mines, no airplanes, no depots. They added Lt. Harold I. Judson to assist with the work. A new administrative clerk, Sgt. George Hano, turned out to be an enthusiastic and competent overtime worker. They were given valuable assistance by Capt. George K. Jeffrey, a shipping specialist. Gradually their organization began to take form with everyone contributing nights as well as days. The problem was more than just dropping mines; it was a complex matter of dropping the right type and number of mines in exactly the right places—and at night. They wanted always to keep one step ahead of the enemy and this called for a lot of planning and unorthodox thinking. Among other unorthodox ideas, they proposed dropping mines from 5,000-7,000-foot altitudes. Such low-level B-29 operational flying was considered dangerously close to heresy until the incendiary raids of March 10-20 proved it could be done successfully.

They needed certain types of mines and they needed trained personnel to assemble as well as drop them. The Navy provided the Mine Assembly Depot and agreed to furnish the mines, which would carry parachutes of from six to nine feet in diameter, automatically releasable on contact with the water. Two top-notch Naval mining men, Lt. William Wallace and Lt. James Martin, were transferred from COMMINEPAC, Pearl Harbor, to the 313th Wing as wing mining operations officers. Competent civilian scientists were added gradually to the depot staff until today the very best of them are on Tinian, solving immediate problems rather than experimenting for an indefinite future.

The 21st Bomber Command provided the B-29s and the crews of the 313th Wing based on Tinian. Lt. Donald Boyd, brought from the States, was assigned to the Wing as ordnance mining officer to have charge of the physical loading and handling of mines.

Then came a period of intensive preparation and training. Preparation consisted of gathering every possible piece of information about Japan's current defenses, shipping and economy. Training began with the armament and ordnance crews required to load the mines on the airplanes, and continued with the aircrews who would deliver them. As always, the crews themselves helped tremendously in developing their own bombing methods. Capt. George W. Shaffer of the 313th Wing and his crew, now missing in action, flew many of the first experimental missions from which were developed the aerial mining technique still being used. He and his crew worked nights, flying experimental missions between regular operational bombing missions. These experimental runs were completed by March 7. Although hardly satisfied, the mining crews felt they would be able to run their first mission by April 1.

Meanwhile, other forces were moving into Japan's front yard. The largest invasion fleet ever gathered in the Pacific was heading toward Okinawa. Suddenly the Navy requested 21st Bomber Command to commence mining operations against Japanese vessels that might attempt to counter attack our forces at Okinawa.

The first mining mission took off March 27, four days ahead of schedule, and dropped its new type of mines on Shimonoseki Strait, Hiroshima Bay and large areas in the western part of the Inland Sea. Other B-29s, at the

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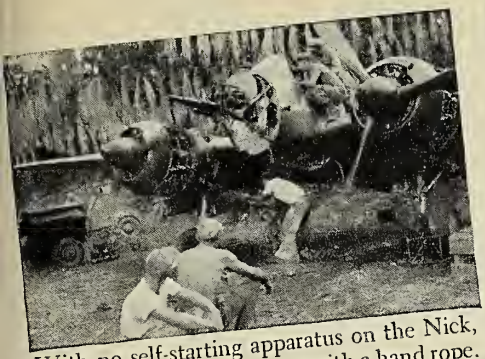
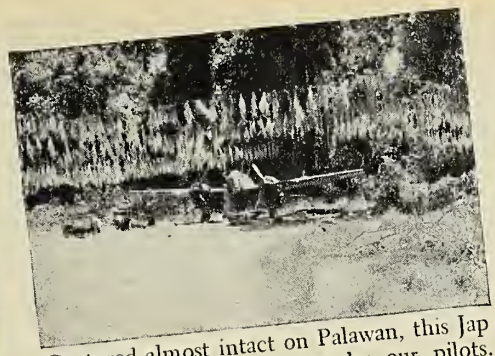
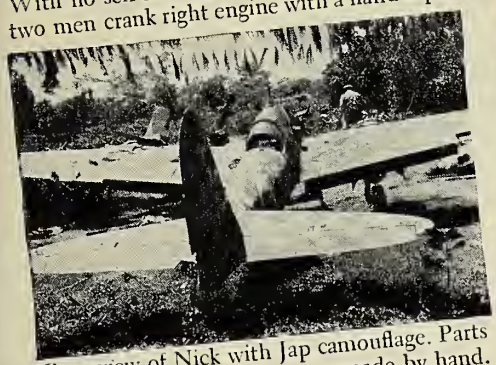


With no self-starting apparatus on the Nick, two men crank right engine with a hand rope.

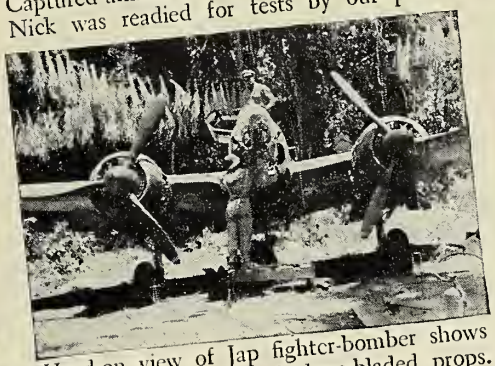


Captured almost intact on Palawan, this Jap Nick was readied for tests by our pilots.

Main armament on Nick for frontal attacks is a 37-mm nose cannon, shown in sideview.



Rear view of Nick with Jap camouflage. Parts necessary for renovation were made by hand.



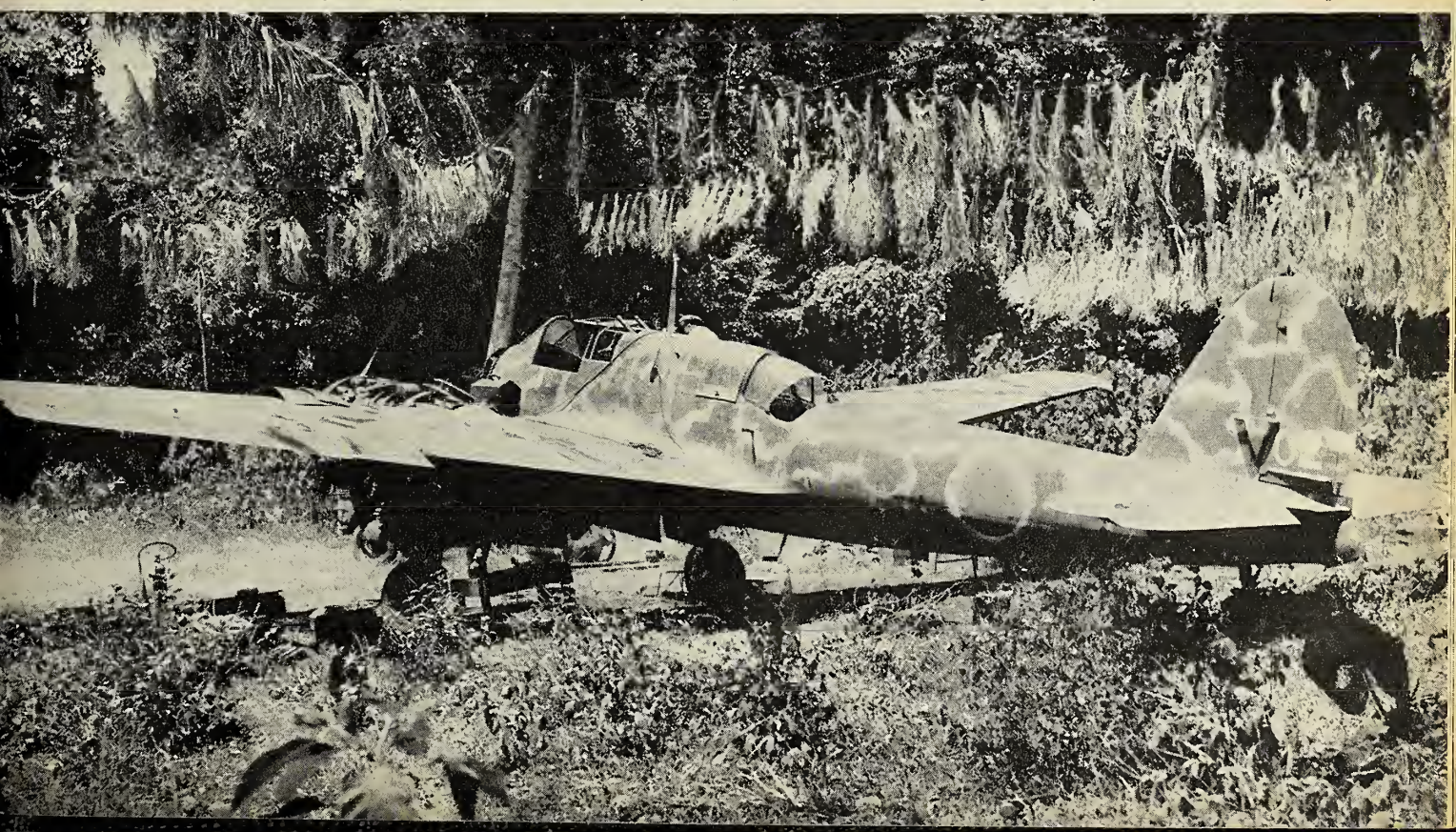
Head-on view of Jap fighter-bomber shows muzzle of cannon and three-bladed props.

Cpl. J. England repairs nose gun as General Barnes, CG, 13th Fitercom, looks on.

NICK gift

In their hurried exit from Palawan airbases, the Japs left plenty of equipment, like this Nick, for our technical intelligence experts to mull over — but they didn't leave any tech manuals for our mechs

Twin fixed .50 caliber machine guns may be seen mounted directly behind pilot. A flexible machine gun also may be fired from rear cockpit.



Guerrilla Lightning

BY CPL. HARRY A. CENTER
13th Fighter Command

From the air, Cebu held no inviting charms for the 11-man Air Support Party circling Tuburan strip.

To begin with, the rugged strip, two-thirds of the way up the west coast of the pollywog-shaped island, had been hastily readied by the guerrillas. It looked like something out of Terry and the Pirates.

The inland area of the island were dominated by ridges rising to 3,500 feet. A main road girdled the lowlands along the shore with occasional dead-end tributaries to the foothills. Nearly all the towns were along the main road, but most of them were full of Japs.

When the support party of the 13th Air Force was safely pancaked on the strip in two C-47 loads, guerrillas hurried to unload the equipment. It wasn't much—a jeep-mounted radio control system and a trailer of supplies.

The C-47s took off again and the party was on its own, the first new American faces to be seen on Cebu in three years. It was February 15, 1945.

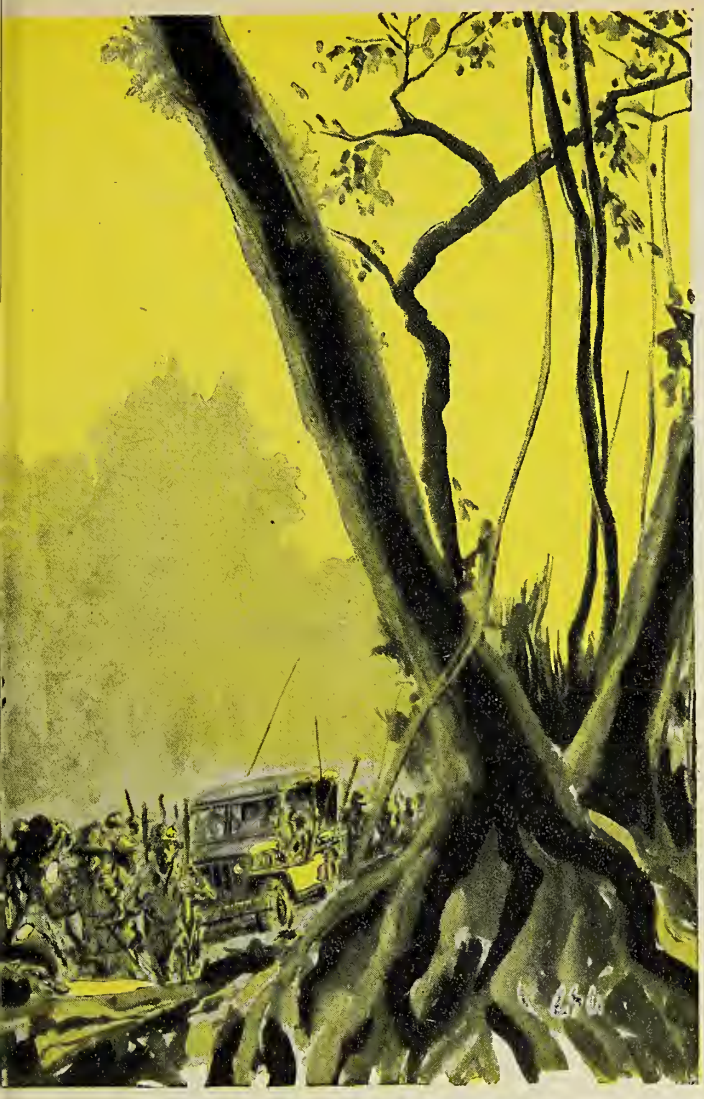
"We shall never forget that welcome," the detachment leader, Capt. Edward M. Thompson, recalls. "People cheered us all along our route. When the jeep stopped they offered us their food—eggs, chickens, bananas, pork, tuba—and with tears of joy in their eyes, crowded around to touch us. They walked for miles to see Americans."

The ground situation, as explained by Col. James M. Cushing, American head of the Cebu Area Command of guerrillas, was ripe for action.

A strong force of Japanese was in the area north of an east-west road slicing the neck of the island. Other forces held the east coast, with their main body in Cebu City.

Colonel Cushing had a tattered but well-trained guerrilla army, its equipment limited to small arms. In earlier days they had made shotguns with pipe barrels—used almost anything that could be fired as ammunition. Later they added rifles supplied by the 8th Army and 4,000 pieces captured from the Japs. There were a few .50 calibers

How a 13th Air Force Support Party, smuggled to Cebu, worked with guerrillas in coordinated air-ground attacks on the Japs



ILLUSTRATED BY SGT. LOUIS S. GLANZMAN

with homemade mounts, salvaged from crashed planes.

Hundreds of guerrillas formed the Volunteer Guard service group. They hauled supplies to the front with a few pre-war trucks fueled with Japanese gas or alcohol distilled from tuba, the juice of the palm tree.

In every town, womens' groups fostered by Mrs. Cushing functioned as volunteer auxiliaries. They fed the army, sewed their ragged uniforms, nursed the injured. Food and quarters were obtained in house-to-house fashion. Nothing was denied the soldiers; no questions were asked concerning payment.

Colonel Cushing's ground strategy was to let the Nips take any specific objective they wanted, then heckle them by hemming them in, picking off expeditions and severing communication lines.

With the arrival of the Air Support Party, the concentration of Nip troops in the north was given first priority.

"You're going close to the Jap lines," Colonel Cushing told the team. "But don't worry. Major Hale's MP battalion is assigned to you for security, and every man will fight to the last ditch to protect you and your equipment."

The first night, 300 Volunteer Guards built a road and hauled the jeep and trailer up the hills to a summit overlooking the Tabuelan-Lugo Road. On the morning of February 16 radio contact with Leyte headquarters of the 13th Air Force was accomplished.

Home and workshop for the control team was a grass shack topping a hill overlooking the target area. Gathered around a bamboo table were the controller, guerrilla intelligence and operations officers, and skilled technicians. Equipment, besides the radio jeep, consisted of an LS-3 speaker grid maps from headquarters intelligence, pencilled maps drawn by residents of the target area, photo reconnaissance pictures, and a pair of 7 x 50 field glasses.

Four F4U Corsairs of Marine Group 12 came over the first day and their flight leader called in to the station. After the flight was authenticated, the controller flipped one carphone for the guerrilla liaison to hear, and clarified the target for the pilots. Checking back, the flight leader described the target as he saw it—an estimated 500 Japs in Lugo, Liki and surrounding palm groves. Guerrilla liaison satisfied, the flight was sent in to bomb and strafe.

The next day four flights of four peppered concentrations in Lugo, Liki and Sogod.

On February 19 an operator standing-by on the telephone system rigged of barbed wire received a message:

"The advance guard of a Jap column will be at the Carmen-Sogod Bridge at 1420."

The operations officer glanced at his watch. It was 1400. He handed the message to the controller. Three flights were expected that day; only two had appeared. A long-shot, blind message went out over VHF.

"Hello. Hello. Any flights in area needed at onee. Report to controller. Report to controller. Over."

An answering voice come from the third scheduled flight—from over the Camotes.

"Hello, controller. Hello, controller. Will be with you in 15 minutes. Over."

At 1420 on the button, the four Corsairs bombed and strafed Carmen-Sogod Bridge and the land around it.

Twenty minutes later, the telephone monitor handed another message to the operations officer:

"Jap advance guard wiped out by planes at bridge. Main body turned back into Rough Riders ambush. Thank you."

Timing had been perfect, the Jap attempt to reinforce Lugo prevented.

Four days later, the guerrilla 88th Regiment under Col. Alexandro Almendras took Lugo with but one casualty. He sent back a runner with the report that the town approaches were dotted with fresh graves, blood and a pile of burning bodies.

North Cebu was under control.

Cebu City was next on Colonel Bushing's list. When guerrilla forces formed their pressure block against the city from the west, the fighter control team and its equipment had to be moved 50 mountainous miles to Dacit Ridge, four miles north of the capital

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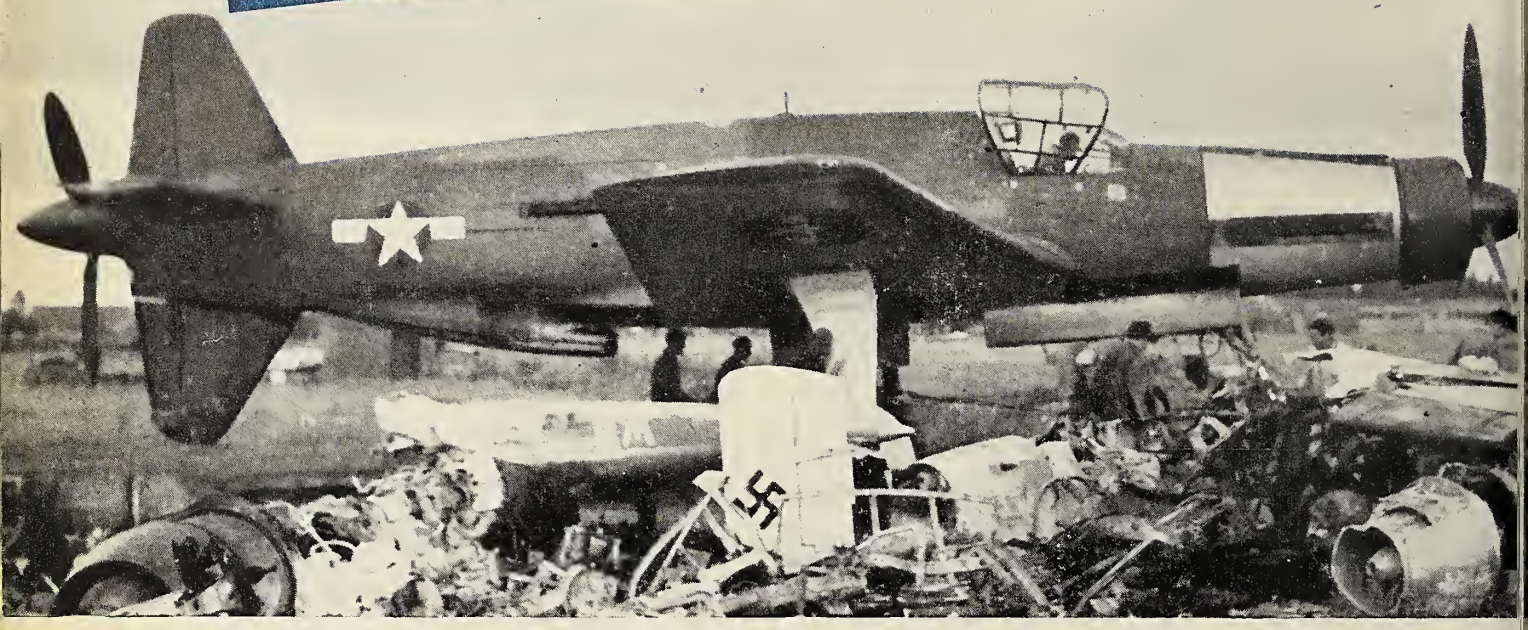
AIR DISARMAMENT, Germany



This Dornier 335, shown with American markings, is driven by a propeller mounted in the front and by another installed in rear.

BY CAPT. CHARLES COOKE and S/SGT. DOUGLAS J. INGELLS

AIR FORCE *Staff Correspondents*

Jules Verne would have gaped in wonder at some of the high-priority projects the Luftwaffe was perfecting at the time of the Nazi surrender: A 5,000 hp aircraft engine, a wind tunnel producing gales three times faster than the speed of sound, a fighter plane with an engine in the nose and another in the tail, non-rotating, non-oscillating parachutes with ripcords pulled by a timing device, a successful flying wing, complete aircraft factories buried eight miles inside of mountains.

Even discounting the widely discussed "interstellar platforms" that were to have shriveled up any designated part of the earth, or the V-3s, V-4s and so on that were to have made any spot in the world the instantaneous target of a super-robomb, most Allied researchers, who even now are probing through the secrets of GAF and Wehrmacht experimental stations, feel that the Germans might well have changed the course of the war had time been on their side.

Technical Intelligence and Air Disarmament men are combing the Reich's scientific arsenal with painstaking care to overlook nothing that could prove of value to us, now or in the future. Tons of documents and blue prints, miles of microfilmed reports, vast stores of special equipment and prototypes of experimental aircraft have been transported to England and the United States for evaluation. It is the greatest treasure-hunt in history, with the most unpredictable hiding places yielding invaluable machinery, plans and models. In a crazy-quilt tabulation, gypsum mines, smokestacks, hospitals, schools, prisons, brassiere factories, breweries, bedrooms and haystacks have all been used by the Luftwaffe to conceal their technological secrets.

The thoroughness with which our job is being performed is a striking testimonial to the long-range planning of our leaders. As early as two years before V-E day, over a hundred of the best staff minds of SHAEF and USSTAF were at work on "Air Disarmament, Germany." As a result, the Air Disarmament Command was activated on September 23, 1944, and based at Watford, England, with a personnel of 3,400 as part of the 8th Air Force Composite Command. Later, however, ADC was changed to Air Disarmament Division, its population enhanced to 13,000 officers and men and its administration turned over to the combat-wise 9th Air Force. Col. Harold K. Kelley is boss of ADD, which is headquartered in a big gray school building in the city of Luxembourg, and which is deployed into every area of U. S.-occupied Germany and Austria. Two Air Disarmament Wings comprise its field organization, one based at Fulda and the other at Kaufbeuren, and these supervise four AD groups (controlling 10 AD squadrons), four-ex-medium bombardment groups (controlling 16 AD squadrons), two ordnance maintenance companies, an Air Service group, a mobile weather squadron and a mobile communications squadron. ADD's packing and crating center, an intensely busy place right now, is at Hanau.

Air disarmament teams, trained at a secret school at Chipping Ongar, England, crossed the channel after D-Day to move close behind our ground forces as they swept into and through Germany, overrunning a spew of AAF targets. Airfields, ammo and bomb dumps, supply depots, aircraft factories and research institutes were surveyed and catalogued. Flash reports were sent to ADD Headquarters of

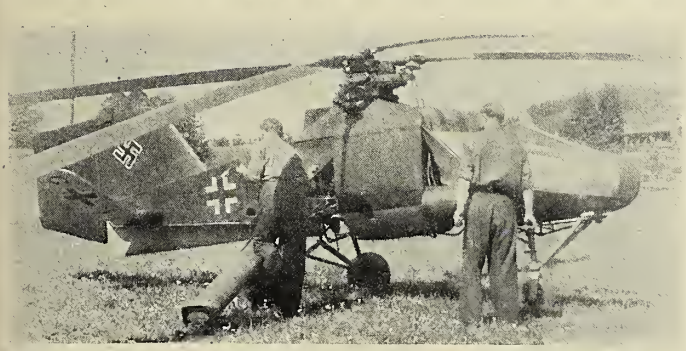
The 9th Air Force has taken off on a new and enormously complex mission—the complete and permanent disarming of the Luftwaffe—and our Wright Field laboratories are busy analyzing the equipment and blueprints uncovered by the disarmament teams

any items that had been expressly requested by Wright Field's Air Technical Intelligence staff, or which were obviously "hot" though not on Wright Field's list. In addition to their known, briefed objectives, ADD men were constantly uncovering "targets of opportunity," on which exhaustive reports were made. And the work goes on.

As indicated, top priority is given to materiel requested by Wright Field's ATI. Next in importance comes materiel which can be turned over to United Nations forces, without prior ATI scrutiny, for direct combat use against Japan. Third in line is a long list of "common-user" items —equipment which can be employed by our Army or Navy. At the bottom comes scrap.

Nothing garnered by ADD in either its "primary" or "final" phases of operation is thrown away or destroyed. As defined in a high-level policy decision, primary disarmament is "the separation of the GAF from its arms, aircraft and equipment," while final work is, "the complete elimination of Germany's air war potential." In practice, however, the two phases are not wholly separate, and in one day an ADD team may seize a dozen ME-109s (primary) and begin the complete dismantling of an aircraft engine plant (final). Primary operations will be finished by units now in the field, but final disarmament is expected to take years and will be concluded by occupation forces.

Rocket-propelled Messerschmitt 162 fighter plane features tricycle landing gear, bent wingtips, split tail and engine atop fuselage.



Flettner helicopter, with counter-rotating, intermeshing blades, once landed on the deck of a submarine which was moving at 18 knots.

Simplicity and streamlining were prime factors in German jet engine design, as shown below in night fighter version of ME-262.

Needless to say, business has been booming. A late count of known objectives for investigation in U. S.-occupied Germany is 6,245, of which 1,200 had been processed by mid-July. About 100 new cases are being reported each week, and the books are being closed on them as rapidly as facilities permit. Some 800 "hot" items have been collected for shipment to Wright Field, and many of these are too secret for mention here. A few, however, may be spoken of in general terms, and these are presented as a cross-section of the rich prize in weapons our scientists and engineers have been given for "redeployment" against Japan.

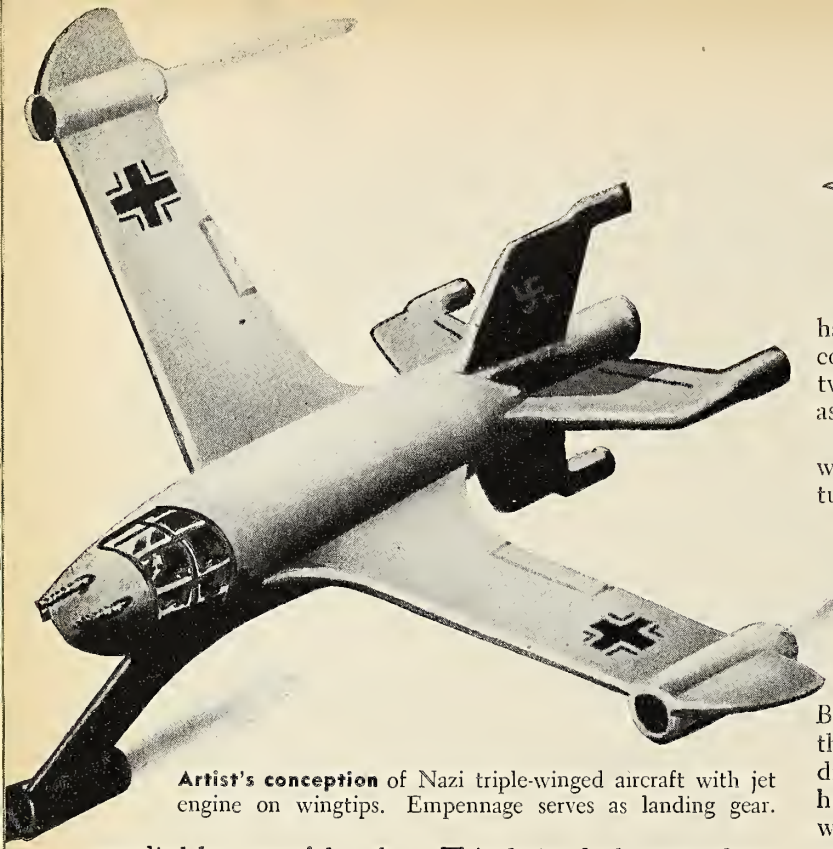
At Oberpfaffenhofen, near Munich, an assembly plant yielded a complete Dornier 335, the "mystery plane" which was to have been the Luftwaffe's answer to the 9th's fighter-bombers. Two Daimler-Benz, 2,000 hp engines are carried, one in the nose and one in the tail. Approximately 450 mph in level flight and 600 mph in a power dive are its reported speeds, while a feature of the craft is a three-button controlled explosive seat which propels the pilot clear of the two props in the event of a bail-out. The seat has its own parachute which opens automatically to steady the flyer until he can disengage himself and pull the ripcord of his own chute.

Near Bad Tolz, a new-type helicopter was pulled out of a hayloft by its inventor, Dr. Anton Flettner, and proudly exhibited to an ADD team. Its two rotors, turning in opposite directions, enabled it to fly straight up, straight down, backward and to hover. In a test it had once landed on the deck of a submarine moving at 18 knots. Flettner and his brainchild had been bombed out of their Berlin plant and he had taken refuge in his country home.

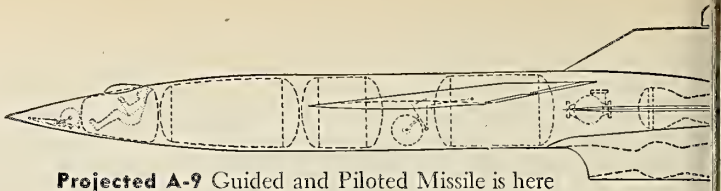
For a long time the Nazis were exponents of the flying wing. They had one design called "The Bat" which was nearing completion when the war ended. Having a shape like one of the nocturnal mammals, it was powered by two jet units buried in a thick wing. The cockpit, except for a low canopy, was streamlined perfectly into the airfoil.

Jet power plants were no vaguely understood phenomenon to the Germans. As far back as 1938, there were reports of jet-propelled experimental aircraft, and two years later we knew that they were flying a jet plane with considerable success. Captured documents make it evident that Luftwaffe engineers long ago rejected the centrifugal compressor in favor of an axial-flow compressor, whose principal advantage is that its lends itself more easily to streamlining and simplicity. Its frontal area is about one-third the diameter of our jet units, and flow of air is straight through the engine nacelles, whereas in our engines the air twists and turns around elbow ducts before it is compressed, mixed and ignited and ejected as hot gas thrust. In the enemy's version, furthermore, a bullet-shaped tail pipe plug effectively varied the area of exit, permitting high thrust power while burning a small amount of fuel.

The most advanced type of German jet plane was the Triebflugel Flugzeug (power-winged airplane) which had three wings placed on its fuselage like the fins of a bomb. It was powered by ram-jet (Athodyd) units, was shaped like a long cigar and carried one man. The Athodyd engines, long tubes with straight-through ducts which utilize forward speed to compress air, were located at each wingtip, while initial power for take-off and Athodyd operation was



Artist's conception of Nazi triple-winged aircraft with jet engine on wingtips. Empennage serves as landing gear.



Projected A-9 Guided and Piloted Missile is here visualized as a super V-2 long-range rocket bomb.

supplied by powerful rockets. This design had many advantages, since any combustible fuel, gas or liquid, which can be vaporized could be used as fuel—including pulverized coal. Moreover, the Athodyd engine is the simplest type of power plant from the production and maintenance standpoint, and since the take-off rockets were jettisonable after the craft attained high speed, weight could be kept at a minimum.

To get the plane into the air, it was stood on end while a jet blast shot it straight up like a skyrocket, thus eliminating runways. Landing, too, could be accomplished in a small space by pulling the nose up in a steep climb, reducing power slowly, and letting the craft settle to the ground, tail first.

In a Dornier 217, the Athodyd was used as an auxiliary power plant, with the bomber taking off on conventional engines and then switching over to the jet when it had reached a desired speed. In this instance the Athodyd used was a tube 33 feet long with a diameter at its center of 43 inches, tapering about ten inches to each end. Inside, an arrangement of forged tubing permitted fuel to be supplied to 60 jets, which sprayed the fuel against the direction of flight to furnish compression by ram effect. According to closely-guarded records, this switchover increased speed from 250 to 420 mph.

The Germans were not far behind us in the special equipment field. At Regen, the 401st Air Service Group of the 1st AD Wing found a lens factory turning out fine precision lenses for bombsights, in an enormous smokestack. In Erbrach, near Nuremburg, the Ernst Plank factory was happily turning out improved flak sights—and packing them for shipment in American Red Cross cartons originally addressed to United States PWs. A wind tunnel located at Kochel was producing gales three times faster than the speed of sound—and the metal casing of the tunnel had to be enclosed in a water jacket to keep it from melting. It was here that the ultimate shape of the V-2 was decided, while other projects on the agenda included a robomb to be launched from a submerged submarine, a V-2 with wings and autopilot, a torpedo with an 80-mile range and anti-aircraft rocket projectiles of revolutionary design. Then, too, a 5,000 hp aircraft engine was discovered, having 48 cylinders in the form of four V-12s hooked on a common crankshaft and gear box. This project, shelved for two years by Goering's Air Ministry, was frantically revived as the twilight of Nazi power approached.

The bag of machinery, prototypes and special apparatus would have been of relatively little value without the capture of the scientists, designers, inventors and manufacturers who made them into operational realities. Hundreds of these men were caught in ADD's dragnet and rounded up for interrogation. Many were eager to talk freely, and from their written statements we have obtained a clear picture of German military planning and thinking.

Among the bigger fish is Professor W. von Braun, whose background probably qualifies him as one of the Reich's outstanding authorities on rockets. In a brief dissertation on the development of liquid rockets in his homeland, he gives an illuminating estimate of the regard with which this form of power-source was considered as a weapon of the future. The professor writes of experiments being conducted as early as 1929, of serious military interest in 1932, of extensive research at Peenemunde on the Baltic, of trials in 1938 with the first liquid rockets having automatic control systems and rudders and which could reach seven miles into the stratosphere when fired vertically.

Referring to the robomb, von Braun places it in Nazi long-view planning as merely the beginning. He discloses that it was intended to construct a winged V-2, designated as the A-9, which would carry a crew and be equipped with retracting undercarriage, pressurized cabins and special acrodynamic aids for landing. About 375 miles in 17 minutes was the expected rate of travel, and range was estimated at more than 3,000 miles. Another possibility he mentions is the construction of multi-stage piloted rockets which could reach a maximum speed of more than four miles a second outside the earth's atmosphere. "At such speeds," he points out, "the rocket would not return to the ground, since gravity and centrifugal force would balance each other out. The whole of the earth's surface could be observed from such a craft, and with the aid of powerful telescopes, such objects as ships, troop movements and construction work could be seen and reported."

A further plan dear to the hearts of German masterminds was the building of an observation station in space, using rockets to carry up men and materials. Erection was considered no problem as the components would have no weight in the state of free gravitation, and the work could be done by personnel wearing some form of diver's suit, moving at will in space by means of small rocket units.

It was along such lines as these that the enemy was working and thinking when the war came to an end. And it is to forestall the fulfillment of such plans that the Air Disarmament Division has undertaken to eliminate the German Air Force once and for all. That is the task assigned to the 9th Air Force, and only when it is completed will they be able to write, "Mission Accomplished" across the record book of the war in Europe. Long afterward, however, the slow work of study, appraisal and classification will continue in American laboratories and proving grounds, as our own aircraft engineers adapt enemy resourcefulness and cunning toward the molding of a stronger AAF. ☆

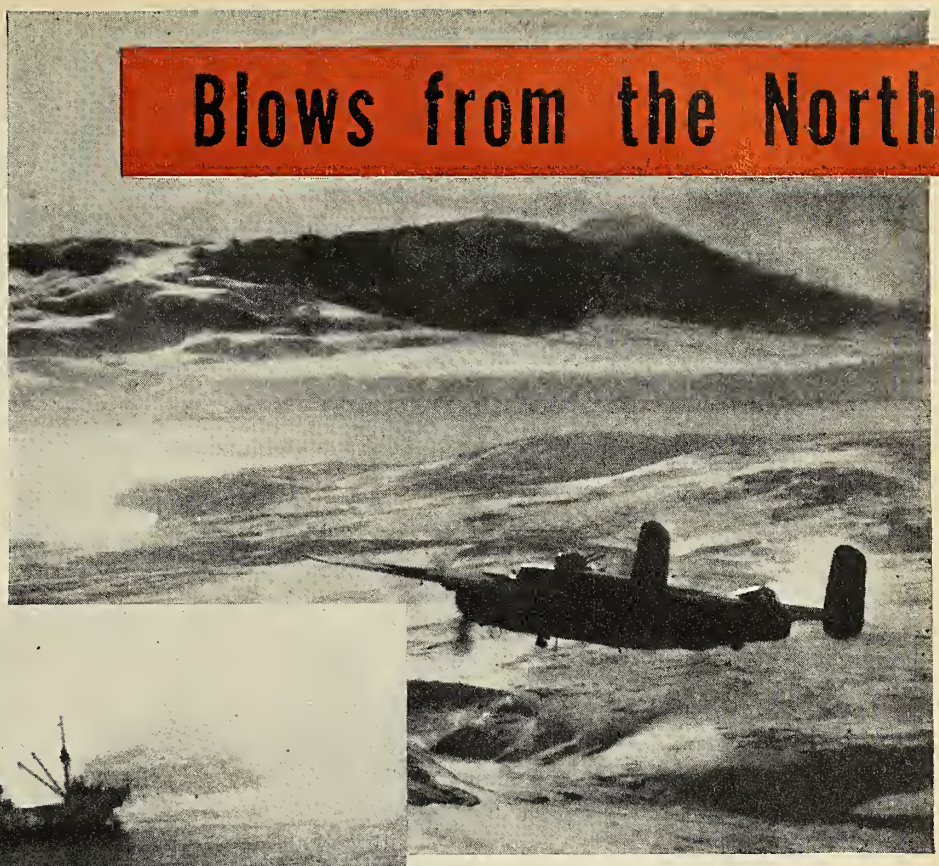
Blows from the North

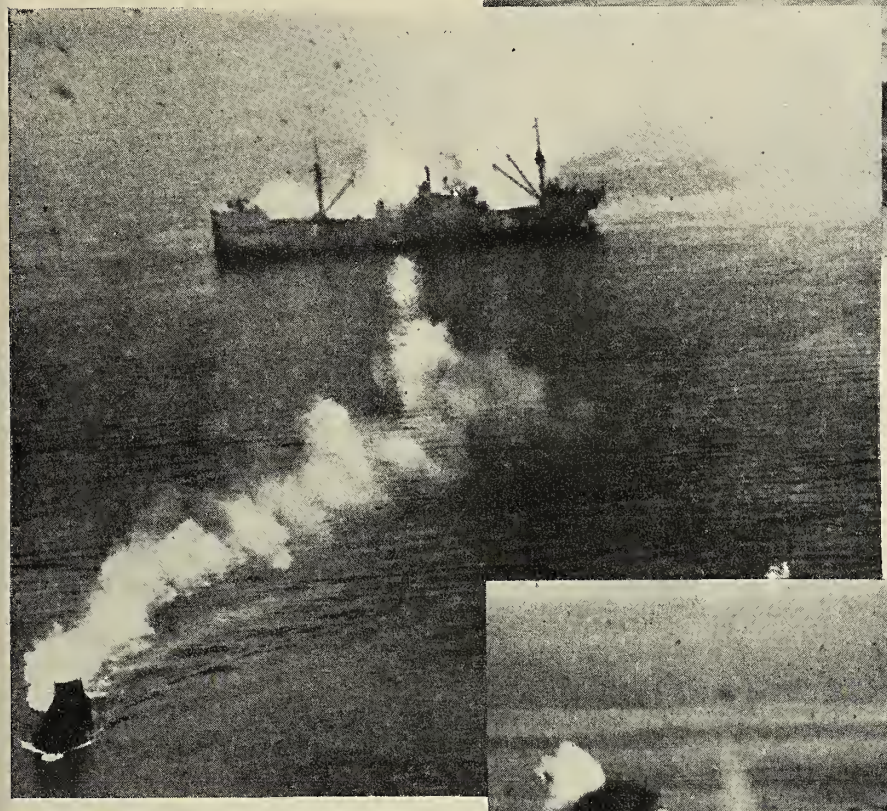
Striking from Aleutian bases, the 11th Air Force completes the AAF ring around Japan

After three years of handling the cold, dreary job of holding down the northern flank of the AAF ring around Japan, the 11th Air Force is still blasting the Japs. The campaign waged by the 11th has been in three phases: the first ended with the Jap defeat at Dutch Harbor, June, 1942; the second culminated with the evacuation of Kiska in July, 1943, after the Japs had been chased from the Aleutians; the third is the continuing Kurile offensive.

Northern Kurile bases were to have been a Jap springboard for invading the U. S., but since June, 1944, the 11th has kept the Japs strictly on the defensive. During such Pacific invasions as those at Saipan, Guam and Okinawa, the 11th helped keep the Japs busy by flying diversionary missions in the Kuriles.

The main targets in the Paramushiro operations have been shipping, airfields, communications, Jap radar and ground defenses, and canneries. A major problem for the 11th is the small size of the target areas, which calls for extreme preciseness in navigation and bombing technique. But the weather and the 1,400-2,200-mile distances also keep the navigators sweating. Only 150 days out of the year are fit for flying and many of those are far from perfect. In rating her enemies the 11th considers weather a big first with the Japs several lengths behind. When the 11th's B-24s and B-25s do get through they are opposed mainly by Oscars, Zekes, Hamps and sprays of fairly accurate ack-ack. ☆

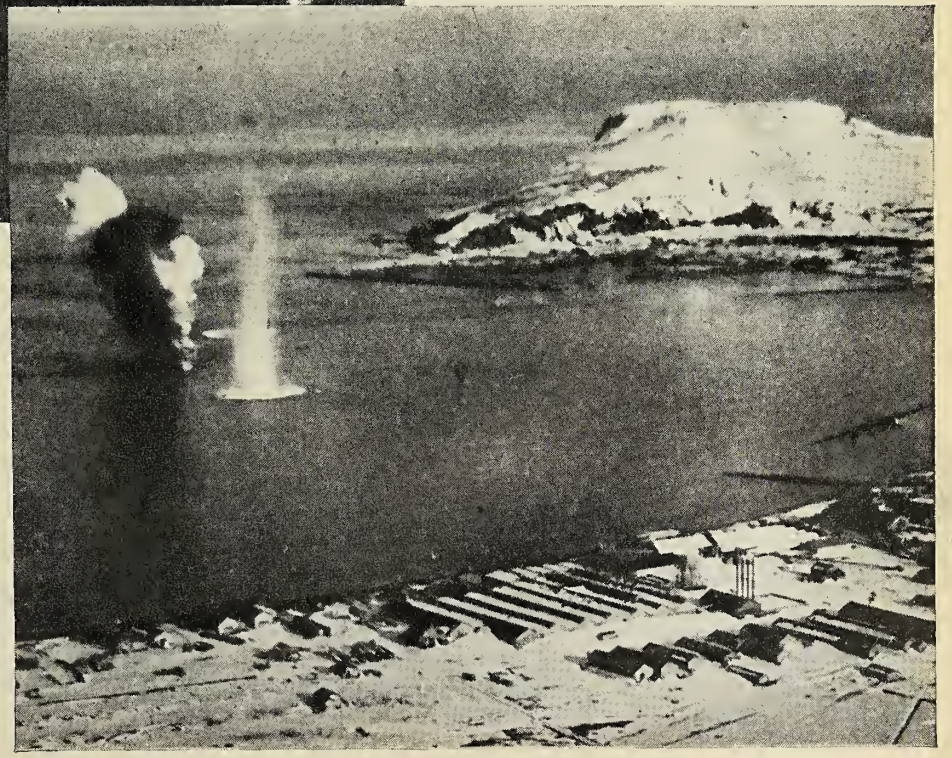




Lead B-25 comes in over Shimushu, northernmost Kurile island, to attack Jap convoy in Paramushiro Strait. Volcanic cone in distance is Araido To.

Direct hit blasts Jap freighter as small trawler scurries for safety, smoking from strafing damage. Ship and shore ack-ack knocked down one B-25.

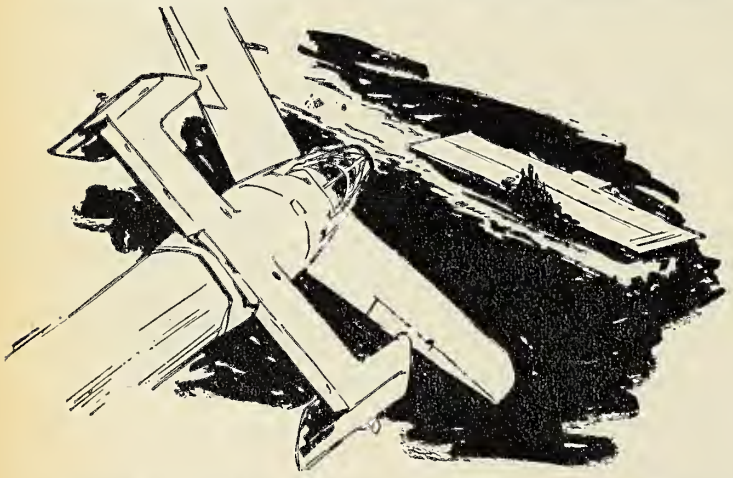
Mitchell at right has strafed troops and buildings after pasting 2,500-ton cargo ship with direct hits. Total of six Jap vessels was sunk during attack.



THIS IS YOUR ENEMY

. . . it's your life or his

You Are the Bombs. When Rear Admiral Masubimi Arima, commander in chief of a Jap airfleet, was reported by Radio Tokyo to have "dived his flaming plane upon the deck of an Allied carrier" in the battle of Formosa, he made the first headlines in the continued story of Jap air suicides. In various guises since then, Japs have committed Jibaku. This flaming aerial melodrama, which Tokyo announcers now describe as "deathlessness in death," puts the hitherto exalted



business of hara-kiri on a pretty earthly and prosaic plane. At any rate, "Kamikaze," a term borrowed originally by the Japanese Naval Air Force from folklore, has been squarely planted in the history of the Pacific air war (See "Divine Wind Blows Nobody Good," Page 14, July AIR FORCE.)

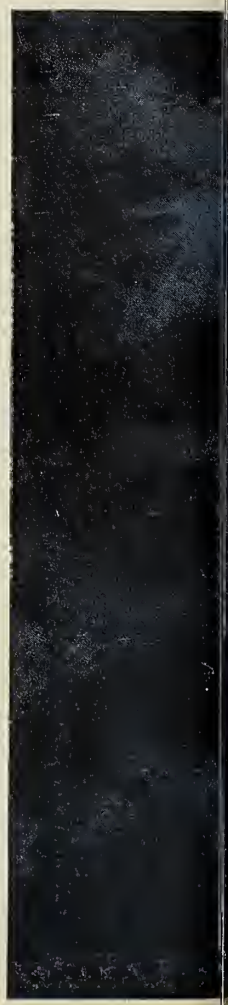
Apart from the deliberate nicking, side-swiping and crashing that occasionally occur in dogfighting, the majority of earlier air crashes were probably the result of "fly-through" tactics. As the Japanese have pointed out, their organized suicide program did not get underway until autumn of 1944. Initially it was a desperate attempt to stem Allied naval operations. Tactics varied, but they were obviously not impromptu. Some pilots used a vertical dive from high altitude; some approached low, gained a few hundred feet and then dived; some came in at shallow angle glides; a few made vertical dives, dropped bombs on one ship, hedgehopped a second, and crashed a third; some made a strafing run and then turned back to crash.

Less systematic in plans than the Luftwaffe, the Japs were nevertheless speedier about putting suicide into operation. Special developments were also encouraged. Most widely advertised is the Baka, invented by a Lt. Comdr. Niki of the Japanese Navy. Although it acquired the name meaning "fool" from Allied intelligence officers, it was originally known as Oyako, the "mother-child bomb." First of the Army planes to act the "mother" role was the Helen. Usually the bomb is launched from the air, but it was planned for ground launching as well. Some types have been fitted with wing-rockets. (For details see "Inside the Baka," Page 28). Among related weapons newly developed, Flash V-1 looks something like the P-51 and is intended for attack on both naval craft and bomber formations.

Superfortress crews of the 20th Air Force have reported relatively few suicide attacks compared with the Navy's experience in the battle of Okinawa. The die-to-kill attacks will grow more prominent, perhaps, as Japan's situation becomes more desperate. So far, no standard approach has been observed by the B-29s. Evasion, increasing frequency of night missions, and effective fighter escort will discount effectiveness of the attack. Announcements from Tokyo addressed to the Americans concede that the suicide program has exacted a terrible toll of Japanese airmen. More heavily brocaded "addresses" to Kamikaze pilots about to depart on a mission are designed for Japanese. Compared with a turning knife or a running jump off a cliff, this kind of military "honor" undoubtedly gives the airmen satisfaction as they hear their CO intone, "You are not mere bombers in formation. You are yourselves the bombs."

Hirohito's Deficit at Borneo. Gradual conquest of Borneo was somewhat shadowed by the direct attack on Japanese islands. It was a significant chapter, however, in Japan's decline. On November 16, the Japs were able to put 220 planes in the air over Borneo; seven months later, they could muster only 9. In the same period, airfields available to them had been reduced from 20 to 6. These figures, however, do not suggest the quality of the Japs' defense of the island. Beginning with the first raid of the pre-invasion campaign, August 13, 1944, and continuing through the months of autumn and winter, direct Jap interception and air-to-air bombing were often effective. By the time of invasion, both had dwindled.

Resources secured for the Allied cause by the advances of the Australians and Netherlands East Indies troops were important. These areas once produced about 20,000,000 barrels of oil annually. Reclamation is well underway. With a population of about 3,000,000 Borneo was prominent on the Jap calendar of conquest for other reasons—timber, crude rubber, copper, coal.



Eleventh Hour in Italy. GAF evacuation measures in Italy give sharp evidence of what may happen to a defeated air force. As the Allies crossed the Po, only 26 German planes managed to get out to new fields. The mass of Luftwaffe flying-stock was destroyed on the ground. Three Italian groups in the GAF, getting no orders to retreat, burned their equipment, and headed for home. As the second week in May began, General von Pohl's headquarters proper was left with one JU-188, four FI-156s and 23,000 assorted Nazis in various states of disrepair and disillusionment.

MATAF statistics tell the story. The GAF's Italian inventory of gas, by cubic meters, went down from 3,600 on October 1, 1944, to 780 on January 1, 1945. From the first week of January until the end of hostilities in May, planes of the MATAF flew about 105,000 sorties.

Jap Air Diet and Dosage. Although the Japanese airmen do not have anything comparable to the AAF's flight-feeding program at Smoky Hill, nutrition for flyers and routine aviation medicine have been given elaborate attention by the JAF. Chocolate stieks, dried fish and fruit are common in aircrew lunches. Air surgeons prescribe massage for muscular fatigue; for general fatigue, dextrose injections; for sleepiness in flight, a sleep-prevention pill bearing the provocative name of Inemuri Boshi Shoku.

Vitamin tablets are common additions to JAF diet. Each flyer is given fresh fruit, such as apples or persimmons, and one glass of fresh milk daily. "Night-vision tablets" and air sickness remedies are also general issue for aircrews. One bottle of Air (Koku) Whiskey and another of port wine are allotted to fortify the spirit, stir the courage and improve the outlook.

By the Light of the Moon. Not long ago Jap night fighters were handed new handbooks. Discussion of their highly dangerous aerial trade ranges from very broad generalizations to speeific suggestions for attack. Night fighting, the manual says, is largely dependent on "concentrated firepower, achieved by coordination and careful formation flying." Approach from the rear is recommended, but actual attack should generally be from the front, "slightly low, determined and lightning-swift, according to the skill of the men and the degree of visibility."

The problem of night vision is given emphatic but somewhat vague treatment. "The most difficult part of night fighting," the trainee learns, "is detection of the enemy. Even when moonlight is insufficient, one can expect night fighting to be much the same as day combat once the enemy is spotted, but for some reason deteetion of the enemy at night by direet vision cannot be systematic."

In case the night fighter forgets all this, he can act on the final suggestion: "When other methods fail, ram the bomber."

Cooking—With the Gas Off

Though music be the food of love,
As Shakespeare said—we still were wrong
In June to muddle food and song
With talk of "stewing samisen."

GIs from here to Zanzibar
Yelled, "That's a boiling Jap guitar!"
Wrote scholar-cooks from islands rocky,
You mean SUKIYAKI, pronounced SKEEYAKI.

Hereafter we will keep our stews
Separate from the lyric muse.

B-29 That Wasn't There. Jap "bait" spotted by photo reconnaissance is varied. One triek involves the outline of a B-29, done in lime, with a trail streaming out from one engine to suggest fire. The layout is intended to lure Allied planes to low level over a field studded with antiaircraft.

Captured airfields once used by the Japs reveal an increasing number of bamboo and wicker decoy planes. Most common "designs" are those resembling Tojo, Frank, Sonia and Sally. They work, too; most of those examined have been pretty well shot up or bombed. ☆

ILLUSTRATED BY SGT. LOUIS S. GLANZMAN

WELCOME TO DULAG LUFT

By CAPT. ERIC FRIEDHEIM

AIR FORCE Overseas *Staff*

ILLUSTRATED BY T/SGT. DON BROCKELL

A P-47 pilot, just released from a POW camp was wondering, almost seriously why the Germans lost the war.

"They seemed to know everything about our air forces," he said. "They had accurate information about most of our secret equipment and they could tell how many airplanes and men we had in practically every combat group in England. At Dulag Luft, their interrogation center in Frankfurt, they even could predict what targets we were attacking next.

"When I was captured, the interrogator at Dulag Luft greeted me like a long-lost brother. He said they were glad to see me and had been expecting me for some time.

"And you probably won't believe this. That joker actually inquired about my mother's health in Terre Haute and asked how my kid sister was doing in high school."

To our Counter Intelligence officers, there is nothing remarkable in this pilot's story. During the past few months they had heard the same thing from hundreds of other American flyers who had passed through the POW processing of the Luftwaffe. Their own investigations had convinced them long since that throughout the war there was little the Germans did not know about Allied air operations. The CIC was painfully aware that many of our most closely guarded air secrets often came to rest in the files of the enemy intelligence staff within a matter of days or even hours.

Most of our captured airmen were mystified when German interrogators confronted them with a seemingly vast store of facts and figures about virtually every phase of Allied military aviation.

"They must have had spies in every American and British squadron," an astonished group commander reported. "When I came to Dulag Luft they not only knew the name of my adjutant and mess officer but also the fact that I promoted them three days before."

There is no evidence that the Germans had spies planted among Allied combat units. According to CIC, this probably would have been a waste of effort. The truth is that the Germans obtained most of their information directly from Allied sources, a large percentage of it through carelessness and laxity in observing security regulations.

Tucked among the archives of Dulag Luft are thousands of documents, photographs, letters, newspaper clippings and papers of all sorts —carefully indexed and catalogued. From this vast collection, the Germans extracted the keys that opened the doors to many of our military secrets.

A substantial portion of this voluminous file flowed into Dulag Luft from the pockets of captured personnel or from Allied airplanes that came down in enemy territory. Part of it came from American and British newspapers, books and periodicals and from monitored broadcasts. Practically none of it originated from German undercover agents in Allied areas.

In this file are many odd items. A railroad ticket, good for a one way journey between two English villages; an American army post exchange ration card marked with a heavy black pencil; the crumpled snapshot of a man wearing a checkered suit; a charred, dog-eared diary whose pages were filled with seemingly meaningless scrawls.

The job of German intelligence agents at Dulag Luft was to find out everything possible about the Allied air forces.

There are more ways than one to spill the beans and the 'greeters' at this famous interrogation center were familiar with them all when it came to gleaning information from captured Allied airmen

The fact that they succeeded remarkably well is revealed for the first time in a staff report prepared by Capt. Gorden F. DeFosset of the Counter Intelligence Corps, U. S. Strategic Air Forces in Europe.

It is an amazing account of ingenuity and clever detective work by which the enemy combined the use of captured documents and the questioning of prisoners in order to keep abreast of Allied air developments.

Many thousands of Allied airmen passed through Dulag Luft where all were subjected to varying forms of questioning. There was no torture or other severe physical mistreatment. In contrast with the Gestapo, the administration at Dulag Luft generally observed the Geneva convention and sought to loosen prisoners' tongues with methods more subtle than a rubber hose.

It is to the credit of American airmen that most of the information assembled at Dulag Luft did not come from them directly. The average prisoner refused to be lured into a discussion of his job in the air forces or any other military subject. But there were some, of course, who for one reason or another, did talk freely. From what the CIC has been able to learn, 80 per cent of the information obtained by Dulag Luft was supplied by captured documents and the rest from POW interrogation.

The documents evaluation section at Dulag was staffed by experts. The amount of useful data they could extract from a seemingly innocent piece of paper testifies to their efficiency and resoureefulness. Nothing in the way of documents, written or printed, was too insignificent to merit close scrutiny. They would pore over a copy of a service newspaper, a letter or an officer's AGO card as though they were blueprints for some new Allied secret weapon. And not infrequently their painstaking efforts were rewarded.

There was the case of the railroad ticket. The circumstances under which it was found gave the Germans an important lead about the impending transfer of airmen attached to a British Wellington bomber group from one part of England to another. On the basis of this information, the Luftwaffe subsequently learned that the RAF was shifting a number of these planes to antisubmarine patrol duties.

Then there was the case of a Flying Fortress pilot who bailed out over Germany. Captured immediately, he was taken to a nearby airdrome for preliminary search and questioning. The pilot refused to divulge anything more than name, rank and serial number, and after relieving him of his watch and wallet, his captors sent him on to Dulag Luft.

Here he was handed a questionnaire containing 27 questions ranging from the identity of his unit to his religion and home address. Quite properly, the pilot refrained from answering these questions.

"Why do you refuse to identify your group," his interrogator asked.

"I am not required to give you anything beyond name, rank and serial number," the pilot insisted.

The interrogator laughed and pulled a note book from his pocket.

"You Americans must think we are stupid," he said. "We already know everything about you. We know with certainty that you are from the 100th Bomb Group. If that surprises you listen to this."

Reading from the book, the interrogator not only told the pilot the location of his base but also described the English countryside surrounding it. With obvious glee, he correctly named the group's commanding officer and then discoursed for several minutes on the condition of the bar at the 100th Group's officers club.

The astounded pilot's resistance melted. Confronted with so much information about his unit he saw no reason to remain silent any longer.

If that pilot still wonders how the Germans found out he was from the 100th Group, the answer is in the files of Dulag Luft. Inadvertently he gave himself away by the ration card he carried in his wallet.

Although the same type of ration card was issued to every American military organization in the ETO, Dulag Luft's experts could identify the unit to which a prisoner belonged by the manner in which his card was cancelled. The post exchange clerk at the 100th Group always used a heavy black pencil when marking the cards. At this base, the PX counter was constructed of rough board and all the cards from that group carried the impression of its distinctive grain pattern in the pencil marking.

American airerews always were briefed against transporting papers and other extraneous documents, but in the words of one Dulag Luft officer "their partiality for personal souvenirs had long made itself felt to the advantage of the Germans."

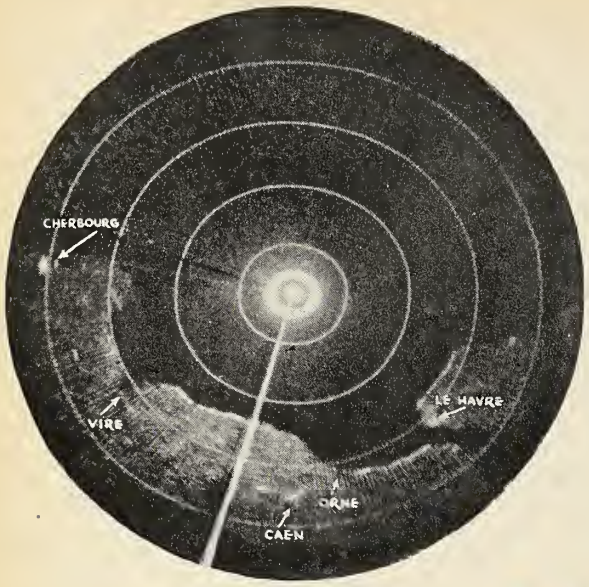
One day, a newly-appointed American group commander was shot down and killed during an operational flight over France. A notebook found near the wreckage was sent along to Dulag Luft. Although it was partially burned and the notes almost illegible, Dulag's sleuths soon managed a substantially accurate interpretation. From this little book, the Germans obtained their first authentic information about the number of bomber erews undergoing training in the United States as well as how many heavy bombers were available for this purpose. More important, the notebook divulged highly secret data about the very heavy bombardment program and also the illuminating fact that at that particular time there were not enough B-29s on hand for training.

Another time, a Marauder group, en route from America to England, was caught in bad weather and crossed the Normandy coast by mistake. Three of its aircraft were shot down and several crew members captured. Among the documents seized by the Germans was the diary of a flight leader listing the names of all the crews in the group as well as up-to-the-minute reports on the serviceability of every plane.

These are extreme examples and fortunately few in number. For the most part, Dulag Luft drew their clues and leads from considerably less conclusive evidence.

A fruitful source for identifying the units of prisoners were the photographs furnished Allied airmen to facilitate their escape through the underground.

(Continued on Page 73)



Normandy beaches looked like this in the radar scopes of 8th Air Force bombers during pre-invasion reconnaissance flights. Despite solid clouds, coast line and built-up portions of towns show up clearly.

Stripping the mystery and Buck Rogers magic from one of the most important scientific developments of the war

A B C of radar

Radar scopes looked like this when invasion was in progress. Radar operator has turned switch to obtain a magnified exact picture of small section of coastline. Scores of small craft are recorded as white blobs off the French coast.

BY CHARLOTTE KNIGHT AIR FORCE *Staff*

Radar is probably the most widely discussed scientific development of the war. Ever since its partial unveiling a year or so ago, there has grown around it a fabulous collection of tales—some tall, some true, some flavored with comic-strip magic. To bring the subject down to earth, AIR FORCE presents a few non-technical ABCs about this electronic miracle of World War II.

To begin with, there are things it won't do—such as "see" under water, through mountains, or around corners.

But it is true that it will do just about everything else. Radar can detect and record the approach of a plane long before the aircraft can be heard or seen. It can spot surfaced submarines and pick out bombing targets through the thickest overcast. It can lead planes to unknown and frequently unseen landing fields, and its airborne "pathfinders" can blaze trails to all-important DZs (drop zones) in advance of paratroop invasions. It can be synchronized to "control" searchlights and guns, both ground and airborne. In spite of clouds or smokescreen, it can give pilots a current relief map of the terrain beneath, or warn them of fog-bound mountains that loom up ahead. It is the secret weapon that enables night fighter pilots, invisible to the enemy, to seek out and destroy hostile raiders in blackest night. And it can determine whether or not a craft is friend or foe.

All this and more.

There are now scores of different types of radar in operation, all devised to meet specialized needs. All of them, however, have this one common denominator: detection and ranging by means of radio waves. One misconception, commonly encountered, is that radar is vastly different from radio. On the contrary, radar is a type of radio, and there is nothing mysterious about it when you learn what the word itself means. "Radar" is of wartime coinage, made up of the first letters of these words:

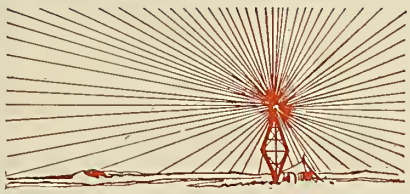
RADIO DETECTION AND RANGING
RA for Radio, D for Detection
A for And R for Ranging

Strip from it the Buck Rogers aura with which it has been popularly surrounded, and radar emerges as an easily understood principle, as elemental as bouncing a rubber ball against a wall. Radio waves go out from a transmitter, strike a solid object and "bounce" back again. By measuring the time that elapses between the time the radio "pulse" is sent and the time the reflecting "echo" is received back at the station, you can arrive at the range of the object or "target."

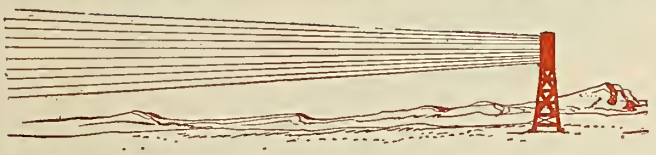
Although the principle, so-stated, is here reduced to its simplest terms, it is not intended to imply that the radar

mechanism itself is anything but the complex, delicate and slightly uncanny equipment it actually is. One experienced radar operator voiced the feelings of the majority of his colleagues when he said, "For two solid years I sat in front of a scope and interpreted 'blips'. I saw *what* the radar did, but I still don't know *how* the damned thing did it."

The "how" is a little matter that kept some of the leading scientists of the United States and Britain huddled over quartz crystals and vacuum tubes in secret laboratories for more than a decade before radar came of age in the Battle of Britain. Stated in very general terms, this is what the inventors were up against: ordinary radio—that is, long and medium wave—sends out energy in the form of ether waves in *all* directions at the same time. It is not localized nor are its waves of sufficient strength to be reflected from objects they may strike.



In order to do any detecting, it was necessary to use very short waves, concentrating a tremendous amount of energy into a directional "beam," like that of a searchlight, which could rotate in a 360-degree sweep. Any object in the path of this beam

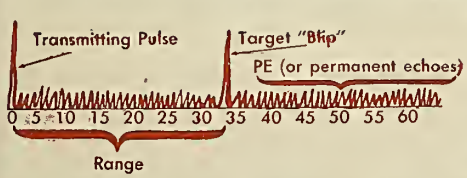


would cause the radio waves to be reflected and these echoes in turn could then be picked up by receivers back at the sending station.

This is what happens then: the transmitter sends out a pulse, waits for an echo, transmits another pulse, waits, and so on. This process is completed from 60 to 5,000 times a second. Of course, if there is no object in the path of the waves, they simply continue into space.

As mentioned earlier, it is simple enough to figure out that if you measure the time it takes for an echo to come back after it has hit something, you can determine how far away that object is. However, it must be remembered that radio waves travel with the speed of light—or 186,000 miles a second—which doesn't allow much time to make any computations about range. A radio wave striking, for instance, an airplane 25 miles away would take only 300 microseconds (300 millionths of a second) to return to the sending station. Developing an intricate instrument that would measure such infinitesimal time-lapses and enable them to be converted into accurate physical distance was the biggest problem in the radar picture.

The scientists set to and found the answer in a particular type of cathode ray tube, which is the heart of the radar set. It is a vacuum tube of special construction capable of permitting the outgoing pulses and returning echoes to be observed on the face of the tube—called an "oscilloscope"—on which is etched a calibrated scale to give true range in yards or miles.

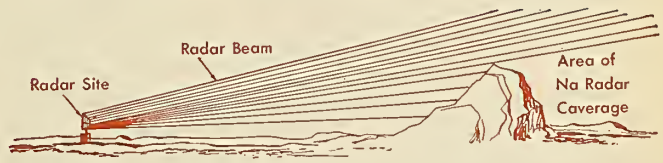


"Scopes" are different types, each providing the radar observer with different information about the "target" under detection. The simplest scope works something like this. Each pulse of energy being sent out creates a spot that starts at the left side of the tube and travels across the face at a known rate of speed, but since the pulses are going out at such a very fast rate, they appear to the naked eye as a solid line called the "time base." When an echo is returned, this appears as a vertical line called a "blip" or "pip" or "signal" at some point along the time base. The distance between the transmitter pulse, which shows up as a blip at the starting edge of the scope, and the echo indicates the range.

Another scope, which is synchronized with the rotating antenna, provides azimuth readings; still another may give elevation of the target, and in some cases two or more of these features may be combined in a single scope. The most widely used airborne scope is a circular one called the PPI (Plan Position Indicator) which furnishes a 360-degree radar picture. In this instance a needle-like time base swings like a sweep-second hand throughout an arc simultaneous with the rotation of the antenna, "painting" as it goes around a picture of all that the radar "sees." The objects encountered appear on the scope in a variety of forms, depending upon their characteristics. Recognition of landmarks below—lakes, cities, coastlines, even ships in harbors—which show up on the PPIs regardless of overcast, makes possible our blind bombing, both direct and offset.

Skilled operators can judge in general the number of aircraft in a target on a range tube by the thickness and pulsations of the blip itself. Special identification equipment (IFF: Identification Friend or Foe)—both air and ground—can automatically produce characteristic signals on the scopes by which friendly planes can be distinguished.

In addition to speed, radar waves have other characteristics of light. For instance, they will not penetrate a hill or any other *solid* obstruction in their path. Much of the radar evasive action on the part of our planes—and the enemy's too for that matter—is based upon this well-known limitation of radar. If a radar set is sweeping an area in which mountains are located, a "shadow" or blank space will appear in the coverage behind the mountains, as shown in the sketch. To avoid being picked up by the enemy's radar, flight paths usually take all possible advantage of mountains, flying in behind them undetected and then "jumping" on the target.



It makes a good deal of difference to the "shadow" effect just how far away the mountain is from the radar site. If it is far enough away, the mountain will have no effect. On the other hand, if the mountain is very close, there will probably be a black-out in coverage at *all* elevations in that direction.

Again like light, radar waves travel in a straight line, with very little "bending" recorded. Since they do not follow the curvature of the earth to any great degree, they cannot "see" great distances beyond the horizon. If the radar beam travels long distances, eventually the beam will seem to rise.

Actually, of course, the beam is a straight line and the earth is receding.

Hedge-hopping or flying on the deck some miles before reaching a target becomes readily understandable when this line-of-sight principle is kept in mind. If you take the radar-optical horizon as your criterion, and assuming your site is at sea-level, these general figures apply: a plane 20 miles away has to be about 275 feet in the air in order to be "seen"; at 40 miles it must be at 1,700 feet; at 100 miles about 5,200, and at 120 miles about 8,000. (This, at any rate, is the *theory*. Actually, there are no hard and fast rules about how radar waves will behave. It is a subject that continually surprises even the experts. Surface craft have been reported "picked-up" by sea-level radar stations 40 miles away, and targets have been unaccountably tracked in mountainous territory where no coverage was expected.)

Radar, like any other type of radio, transmits and receives on certain frequencies. Therefore it makes itself vulnerable to wave-length jamming, a process which both the Allies and their enemies have used with varying degrees of success ever since radar became a serious threat. Both sides have simultaneously continued to develop countermeasures.

War or peace, radar is here to stay. The transition from a laboratory play-pretty into the useful and potent weapon it is today took a lot of selling and a lot of proving. And according to the men who had to do both, it wasn't easy. There were plenty of skeptics in every theater at first, men who could not be easily convinced that several million dollars' worth of queer looking cabinets and cumbersome antennae would considerately let them know a half hour or so before an unseen enemy dropped in to wipe them out.

The radar men who had to set up shop in many of our combat zones in the early days of the war had to be missionaries, salesmen and electronic experts all at once. Not infrequently the highest ranking man in the group would be a second lieutenant, whose gold bars conveyed nothing about his engineering degrees from Cal. Tech or M. I. T. nor about his long, specialized training in electronics labs in both the U. S. and England. He and his highly skilled crew of enlisted men would arrive at some remote outpost with several tons of strange crates and some orders about setting up an aircraft warning system.

"It was sometimes a tougher problem to sell your CO on the idea than it was to replace all your condensers sunk on the way over," said one veteran radar officer. "Most of the time you'd find that in the first place radar had been kept so secret that he hadn't the remotest understanding of what it was supposed to do. And then, being a 'fighting man himself' he'd distrust on sight a bunch of pampered (which we weren't but had to prove) lab technicians. You'd really be out of luck if his attitude also happened to be that of we-got-along-without-it-all-right-in-the-last-war-why-do-we-need-it-now? Anyway, who is a second looey to argue with an eagle?

"But after a few air raids, particularly if our planes were caught on the ground, things would be different. After that these same officers would be willing to settle for anything—even that electronic nonsense—and they'd shout 'Where the hell are those radar boys who were around here getting in my hair?' "

Even as late as the Anzio campaign the boys were having selling troubles. "A number of officers around there didn't have too much respect for the gadget until one night we happened to pick up a ground target and passed it along for routine investigation," related a member of a Mediterranean Signal Air Warning company. "When it turned out to be six enemy tanks behind our own lines, tanks which nobody knew about until that moment . . . well, our stock went up considerably."

Of course it helps, when you're trying to win converts to a new device, to have that mechanism give a flawless performance at all times. Unfortunately radar sets are given to embarrassing their operators on some very awkward occasions, like so many children who throw temper tantrums on the very night that very special company has come to dinner.

There was that night in Iceland, for instance. An aircraft warning system, manned by U. S. military personnel, had just been established on the island a few months before Pearl Harbor. Shortly after it was in operation it got a most unorthodox workout. This is the way one of the radar officers recalls it:

"Remember that big convoy that sailed into Iceland early in September of 1941 when our troops took over? Well, the convoy arrived at night and the boats were to be unloaded next day, so all our personnel and equipment were sitting out there in the harbor of Reykjavik. That night our radar operators picked up a large formation of 'planes' heading toward Iceland. The 'blips' on the scope indicated it was a mass raid which 'split up' into separate flights as it came closer.

"It is scarcely necessary to add that all hell broke loose around there. There were a few P-40s on the island and the pilots were still on the boats. We got them off in record time, got them in the P-40s and sent them up. None of them had checked out on night flying, few of them knew much, if anything, about celestial navigation, but there wasn't enough time to worry about that. We simply scrambled them and headed them toward the approaching 'raiders.'

"Frankly it was a pretty bad time and we were all plenty scared. All our ships were sitting there in the harbor, a perfect target for an enemy raid. We knew there must have been some leak about the landing. We also knew that it was impossible to intercept successfully a raid of the size indicated on the radar scope so we just had to bite our fingernails and wait for the disaster.

"Along about this time, though, the radar operators were going nuts. Something very screwy indeed was going on. The 'planes' had first been tracked at about 200 miles an hour. All of a sudden these 'flights' were observed to be travelling anywhere from 10 miles to 2,000 miles an hour —you heard it the first time: 2,000 miles an hour! This sort of thing kept up all night but no planes appeared. Finally we realized of course that something was playing tricks with our radar and things quieted down out in the harbor.

"The phenomenon has occurred now and then since that ill-fated night, but that was one of our first experiences with the aurora borealis—a subject not covered in the TMs. Technically we call this, or any other such meteorological disturbance, 'anomalous propagation'; up there we referred to it more simply as 'The Old Man of Greenland,' or maybe you'll just hear it called 'phantoms.' There are a

(Continued on Page 76)

AERIAL MAPPING FOR INVASION

No large-scale landing in the Pacific could be made without pre-invasion aerial mapping, an operation which guided our ground forces direct to the Japanese homeland

In the Pacific, Allied forces started out with few reliable maps of the areas on the invasion schedule. Scores of islands were unknown quantities. Some maps dated back to 1890, and they were principally coastal charts. Even these often were inaccurate—the map of Bougainville did not have two of the most important rivers charted; almost all of Borneo was unmapped.

Through aerial mapping, new roads, airdromes and ground installations were disclosed; rivers were found to have changed their courses; water depths and reefs were discovered; towns and cities were relocated.

Even the Philippines, which had been mapped in part, were remapped and new AAF photo methods applied.

Combat mapping in the SWPA, Western Pacific and China Sea areas is accomplished by units recently redesignated Reconnaissance Squadrons Long Range (Photo). These are the only squadrons in the FEAF using the photo B-24s, known as F-7s. In the FEAF organization both 5th and 13th Air Forces have combat mapping squadrons assigned to photographic reconnaissance groups. Their particular assignments are completely dependent upon the long range requirements of invading ground forces, and ground commanders are loud in their praise of the work. This combat mapping is not to be confused with long range photo reconnaissance ("30,000 Foot Periscope", July AIR FORCE), or aeronautical charting which utilizes geodetic control points ("They Map the World," May AIR FORCE), or with tactical reconnaissance.

During 15 months of operation in the SWPA, Western Pacific and China Sea areas, combat mapping squadrons of FEAF have mapped such invasion points as Hollandia, Wakde, Sarmi, Maffin Bay, Biak, Noemfoor, Cape Sansapor, Middleburg, Morotai, Leyte, Samar, Mindoro, Marinduque, Luzon, Palawan, Mindanao, Negros, Cebu, Panay, Borneo and islands in other areas within the inner ring of the Japanese empire.

Not a single F-7 has been lost directly to enemy action.

To show how a combat mapping unit functions, AIR FORCE presents on the following pages the picture story of an actual pre-invasion mapping mission over Leyte last September by a squadron of the 5th Air Force. The action took place between 1630 hours, September 16, and 1630 hours, September 18, and prepared the way for the actual invasion of Leyte on October 20.

HERE ARE THE STEPS IN PHOTO MAPPING LEYTE

1. Frag Order

This is the day before the mission. The most anxiously awaited document is the Fragmentary Field Order. Upon receipt of the "Frag Order," operations personnel compose a flight schedule which informs all personnel who will participate in the mission of the time of breakfast, briefing and take-off, and the aircraft which will be used. Intelligence personnel plot the flight lines over the area to be photographically covered on the target maps and indicate known enemy ack-ack positions on the maps. In addition, Mission Folders are prepared which contain the target maps (one for pilot and one for navigator), navigational charts, and enemy aircraft and shipping identification aids.

2. Briefing

Intelligence officer briefs aircrew members on mission to be flown. They are informed of area to be photographically covered, altitude at which photographs are to be taken, which type camera (K-18 or K-17) is to be used over different flight lines, location of known enemy ack-ack positions, and evasion tactics to be employed in case an F-7 is forced down. When intelligence officer has finished, operations officer instructs crews in manner of approach to the target area, assigns flight lines to be taken by each crew, and type of formation to be used. The weather officer then forecasts weather en route, over target, and return. Finally, communications officer instructs crews in radio codes to be used, what in-flight radio reports will be made, and other information relative to radio communication.

3. In Flight

After a 0300 take-off, three F-7s are over "target," shooting the coast of Leyte Island with their special cameras. Mapping missions are conducted in flights of three planes for mutual protection, and for strip mapping in which each plane covers a designated area. The flying has to be precise. Weather is the biggest problem.

4. Aerial Photographers

At 21,000 feet, the aerial photographers in the camera bay start their cameras after receiving the "go" signal from the navigator. It's the aerial photographer's job to see that the proper filter has been fitted over the lens, that the intervalometers have been set correctly, and that the cameras are functioning smoothly.

5. Flight Lines

Flight lines are drawn carefully over the area to be photographed. Flight line spacing depends on altitude at which mission is to be flown and type of camera to be used. Usually, 60 percent overlap and 40 percent sidelap of successive pictures are employed.

6. Interrogation

As soon as F-7s land, crews report to intelligence for interrogation. Number of exposures, sightings, interception, ack-ack encountered, and weather are reported. Preliminary mission report is telephoned to higher headquarters at conclusion of interrogation.

7. Delivery

Intelligence personnel rush film to laboratory for processing. Success of photo mapping mission rests largely on navigator and aerial photographer. Navigator uses bombsight to pick up check points on ground coinciding with target map. He directs pilot where to fly and instructs photographer when to turn cameras on and off. Navigator and photographer keep photo flight log on which is recorded number of exposures taken of a run, geographical coordinates of the points at which cameras were turned on and off, true altitude, temperature, focal length of cameras, time when exposures were made and type of filter used.

8. Developing

Film is developed by inspection method. Photographer error in judging proper exposure results in either overexposure or underexposure. Experienced developing man notices this immediately and develops film to compensate for photographer error. Photo Intelligence officer views film and plots it against target map to determine exact photographic coverage obtained. From this information final mission report is composed and forwarded to all higher headquarters.

9. Printing

After film has been viewed and lettered by photo draftsmen, prints are made from film. "Dodging" is performed on negatives which are partially overexposed or partially underexposed by increasing or decreasing amount of light in certain parts of printer. Approximately 250 prints an hour are turned out.

10. Distribution

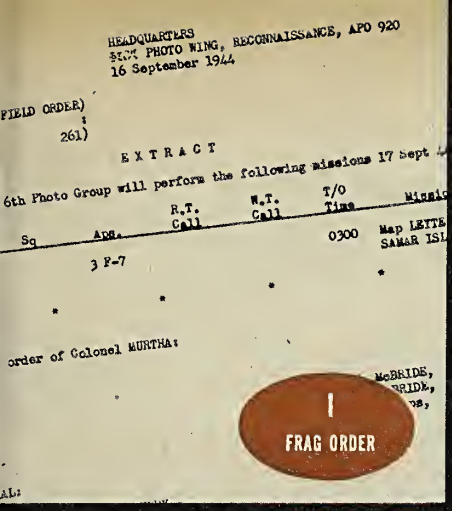
Distribution of prints varies with number of headquarters interested in mission. Besides being used for map making, prints are also studied by various photo interpretation sections for intelligence purposes. "Hot" prints are rushed to photo interpretation sections immediately upon completion of processing. In mapping runs, approximately 14 prints of each negative are required. On Leyte mission, 8,500 prints were made and distributed. Large scale battle maps, photo maps, and special maps are produced from prints at Army base map plants.

11. Invasion Maps

Vital necessity for any large-scale invasion is map showing all details of area to be invaded. These maps must be precise, simple, and yet apprise landing troops of all features of beaches and terrain. Accuracy of maps depends on accuracy of flight strips.

12. Invasion

This photo was taken during landing operations in vicinity of Tolosa, Leyte Island, Philippines. Landing parties were equipped with invasion maps and infantry units proceeded inland along routes previously plotted on maps.


HEADQUARTERS
8TH PHOTO WING, RECONNAISSANCE, APO 920
16 September 1944

FIELD ORDER)
261)

EXTRACT

6th Photo Group will perform the following missions 17 Sept

Sq	Acft	R.T. Call	W.T. Call	T/O Time	Missio
	3 F-7			0300	Map LEYTE SAMAR ISL

order of Colonel MURTHA:

McBRIDE,
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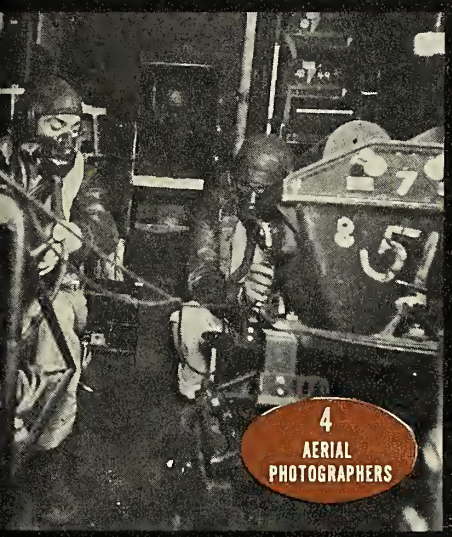
AL:

1
FRAG ORDER

2
BRIEFING

3
IN FLIGHT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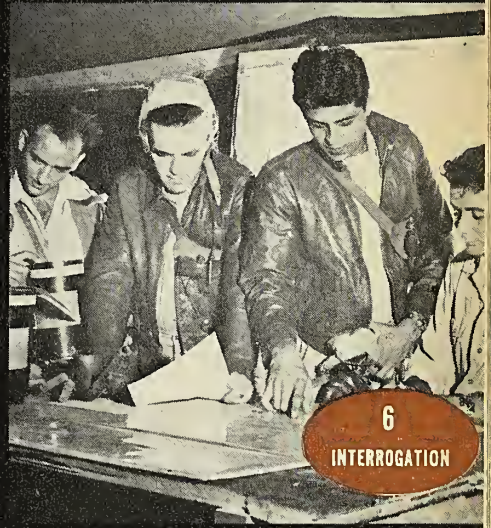
AERIAL PHOTOGRAPHERS

5
FLIGHT LINES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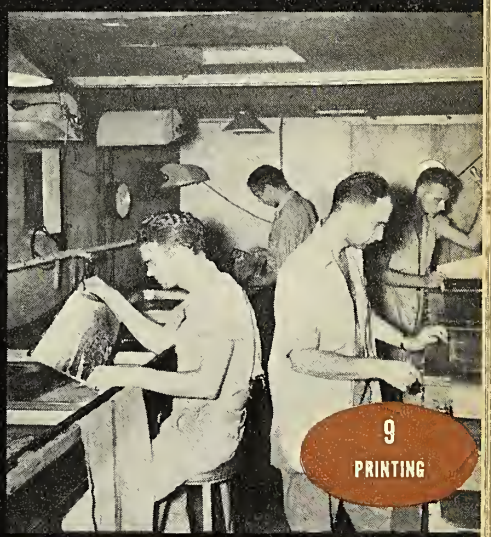
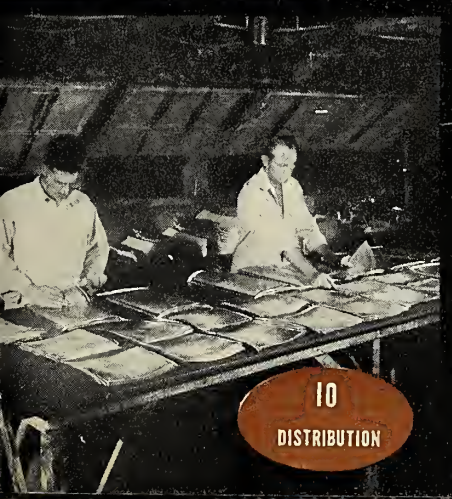
INTERROGATION

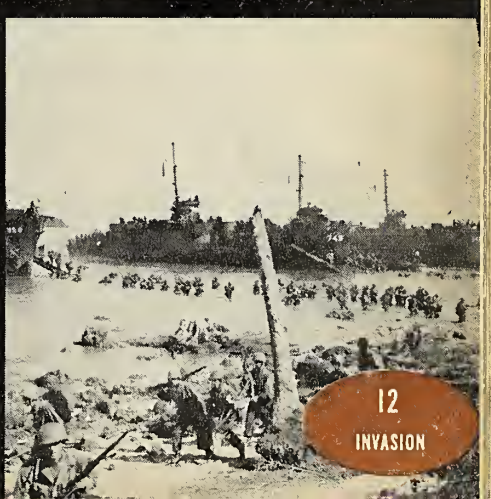
7
DELIVERY

8
DEVELOPING


9
PRINTING


10
DISTRIBUTION

11
INVASION MAPS


12
INVASION

Strategic Kyushu

The industry, communications system and airfields of this gateway to the Jap mainland have proved a fertile target for our Pacific air force

Our forward bases in the western Pacific have made possible the first coordinated large scale air effort against the Japanese empire. Coupled with strategic operations by B-29s, our heavies, mediums, attack bombers and fighters of the tactical air forces in the Pacific now are able to strike the Jap and Chinese mainlands, roam well into the Yellow Sea, hit parts of Korea, the southern portion of the Sea of Japan, all of the Inland Sea, and sever the Tsushima Straits—most vital water route between Japan and Asia.

Strategically, this development is the first direct step in isolating Japan proper from the mainland of China on which the enemy depends so heavily for a prolonged defense of his empire.

The gate to the Jap mainland is Kyushu, southernmost island of Japan. Kyushu's strategic importance is manifold. With the southern tip of Honshu it controls Shimonoseki Strait, an entrance to the Inland Sea. In large measure Kyushu controls Tsushima Strait and Chosen Strait. Kyushu is the nearest to the continent of Asia of any of Japan's important areas. It guards the approaches to southwest Japan and is the seat of a vital industrial district—the northern Kyushu site of the great Imperial Steel Works, largest producer of pig iron and steel in Japan.

Up to the time the tactical air force began operations over Kyushu, air action against this enemy home island was on a limited scale. This spring B-29s were diverted, at the Navy's request, from their strategic task against Japan to strike Kyushu airfields, and the Navy twice has sent carrier task forces against Kyushu targets; these B-29 and carrier strikes were for the most part coordinated with the Okinawa campaign. The B-29s have hit certain well defined strategic targets, and a few land-based Navy planes have run missions over Kyushu. Now our tactical air forces in the Pacific have much of Japan's inner defense within its range and the final phase of the air campaign is under way.

A glance at the accompanying map will introduce the reader to Kyushu. The men who have been introduced to it from the air find three general regions: central Kyushu, a rugged mountainous area extending southwest-northeast across the island in a belt some 30 miles wide; the southern region, of irregular terrain, which includes scattered lowland and coastal strips with rugged mountains, hills and steep-sided plateau blocks, and northwestern Kyushu which levels off from the higher elevations to the east and south with two large level areas and peninsulas and islands extending toward the China Sea.

The northwest section of the island is heavily industrialized but with a known deficiency in food production; the southeast portion is the least densely populated and least industrialized, but known to be nearly self sufficient in food supplies. Kyushu has several excellent ports and many other landings and anchorages. Nagasaki is one of the three major ship building centers and Wakamatsu is the chief coal exporting port of Japan.

The rugged terrain restricts both roads and railroads largely to coastal and valley routes requiring numerous tunnels and bridges and defiles. Railroads far exceed roads in importance, although the communications network, always

a vital target, is believed to be well planned and operated with good equipment. Wartime requirements force communications to operate far above normal capacity and maintenance is believed to be a weak spot in the network.

Over Kyushu airmen often find strong winds and cloud cover; torrential rains and typhoons are prevalent during September.

Kyushu also has numerous airfields. The enemy's first major employment of these fields was in his strong but unsuccessful air opposition to the Okinawa landings. He next was forced to use these airfields in defense of Kyushu itself. Now he faces the possibility of having these same fields become impotent. ☆

KYUSHU

Population: 11,000,000
Area: 14,718.7 square miles
Highest Mountain, 5,705 feet
Railroads, 3' 6" gauge
Main Roads
Secondary Roads
Airfields
Landing grounds
Seaplane Bases
Auxiliary Seaplane Bases

SCALE OF MILES
0 10 20 30 40 50

BEACHHEAD CARAVAN

ILLUSTRATED BY CAPT. NORMAN TODHUNTER

BY 1st LT. WILLIAM E. MASSEE
Hq. 68th Group, AACS

Kunai grass almost hides the clutter of vehicles jammed into the dusty clearing near headquarters of the 68th Group, Army Airways Communications System. Three large trailers are surrounded by a huddle of Army vehicles, tarpaulin shelters and scattered heaps of radio parts. The scene is reminiscent of a carnival ready to hit the road.

Under a pyramidal tent at a packing-box table littered with tools, wire and spare parts, Cpl. Raymond J. Anderson works on a homemade condenser plate, polishing it by hand. The sound of hammering comes from one of the hulking trailers, over which bristles a group of 50-foot antennas, each supported by its guy ropes. Inside the trailer Cpl. Paul H. Weese is busy sealing up a spare parts closet, checking the fastenings on chairs and transmitter doors. Finished with the job, he jumps to the ground, locks the trailer door after a last look around, and for the hundredth time glances at the neat lettering stenciled on the trailer side: *Mobile Communications Unit No. 2. Transmitter Unit. Keep Out.*

Baking under a New Guinea sun, men have worked for three long months getting the caravan ready to roll. Now the first mobile radio station built in the SWPA, complete down to GI brooms bracketed to the walls, is ready to do a job on the next beachhead. Knowledge gained from supplying communications for fighting aircraft during three years of war, in combat operations from France to the Philippines and all the way-stations in between, has gone into the design of this detachment on wheels.

Ever since the days of the first air strike against the Jap, our air forces in the SWPA have screamed for faster and more complete radio communications. When assault troops seize a piece of Pacific real estate, planes begin using captured strips at once for emergency landing and refueling. AACS manages to get the planes down and back into the air again with jeep-mounted control towers, while portable transmitters and receivers handle the first weather reports. But on the second or third day after the task force is in, the communications job isn't so simple. Cargo planes come in by the dozen, neeessitating messages about arrivals, departures and weather conditions. Emergency signals about engine parts, flight difficulties, gas, oil and ammunition supplies may be logged into the message center any minute; rear area headquarters must know how its pilots are doing, what they need. Small, portable transmitters and equally

When task forces were ready to storm invasion beaches on the Jap homeland, something brand new in radio communication outfits had been set up to guide our aircraft

inadequate receivers cannot possibly handle all the traffic.

In Europe, communications for the AAF involved relatively short distances, and buildings could usually be found in which to house the radio units. Landline teletypes were used to handle much of the traffic, for wires could be strung from town to town. In the mid-Pacific a few high powered units were successfully employed to do the job. But the leap-frogging tactics in the SWPA, with its great distances and uninhabited terrain, posed different problems. High mountain ranges interfered with signals and Savannah Five weather caused static; many large and powerful radio units were needed to send out signals loud and clear.

Big radio units were being sent in with our task forces in the SWPA, but it took days to get the equipment set up. Delicately built, these units cannot be operated casually in the open field; moisture or dust will ruin them. In the rush to get the more powerful equipment on the air, these units often were set up too quickly, then overworked. The problem was to get powerful radio equipment, lots of it, and working right. The answer was mobile units.

Mobile radio units, as such, are not new. Jeep control towers were used back in 1943. During 1944 the mid-Pacific battles taught AACS how to mount some of the fragile equipment so it could stand rough jolts. But the 68th AACS Group operating in the SWPA had difficulties all its own, and the coming invasions demanded solutions.

This newest of mobile units can handle as much traffic as the permanent AACS station on Los Negros. It can supply all traffic control and navigational communications that aircraft operating with a task force will ever need, and then some. This outfit can go in with a task force, be operated while the permanent station is being built, then be taken out and overhauled before being sent onto a new beachhead. It can operate completely on its own for 120 days, which means taking along spare parts, maintenance equipment and organizational supplies sufficient to keep the facilities on the air 24 hours a day over that four-month period. Every piece of equipment is shock-mounted to withstand the bumps of beach landings. Trailers are hermetically sealed so they can be dumped over the side of an LST and floated ashore, can operate in blackout, be hidden under trees and their locations changed at will.

The mobile detachment consists of more than a dozen vehicles with the three big trailers stealing the show. One trailer is a receiver unit; another is a message center housing eight or ten clerks plus teletype operators; the third is a transmitter trailer. In addition, the detachment has six-by-six trucks to haul the big trailers, smaller trailers to carry power units and supplies, mobile gas tanks and jeeps.

In operation, the receiver trailer is run up next to the message center, and a cat walk is placed between the two doors. There are seven positions in the receiver unit—for weather intercept, air-to-air ground traffic, and point-to-point communications for weather and PXing. An air conditioning system sucks air through a fan into a duct which runs the length of the trailer, discharging a cool breeze above each position.

The transmitter trailer is removed from the other two units during operations, and connected by long cables which are stored in metal trays under the body when the unit is on the move. In addition to a battery of point-to-point transmitters, a homing transmitter and an emergency homer, there are several air-to-ground sending units. A crew of four can erect the entire antenna system in half an hour. Each transmitter has its own ground, and a radio ground can be provided if necessary. A complete maintenance work center is built in.

The trailers inside resemble lounge cars on the Super-Chief. In the message center, a long table running along one wall has a Spanish-brown masonite top and chromium legs. Six clerks can work at the table, each with his own typewriter bolted into its individual well. A work table for special operations seats two; a brace of teletype positions are set along the wall opposite the clerks' table. The trick chief has a special desk equipped with a radio which can tune in on weather intercepts. A field telephone connects him with the other trailers. An electric fan and a clock are near each entrance; cabinets are partitioned off for rolls of paper and reams of message forms; office supplies are stored in special cubbies; thermite bombs and grenades are fastened into brackets near the field safe. The plywood floor is covered with black linoleum.

The requirements for the mobile unit were figured out by Col. Reeder G. Nichols, CO of the 68th Group, and his staff. The first big decision was to go whole hog: build a complete radio station on wheels, a detachment as big and powerful as a permanent AACS station and just as fast in handling messages. The second decision was to build a preliminary unit which could be used in the Malabang show.

Capt. Kenneth B. Almond, a radio technician with AACS since 1938, was picked for the construction job. Given the pick of men in the organization, he selected a five-men crew: Cpls. Raymond J. Anderson of Oakland Park, Fla., Edwin S. Tomlinson of Brooklyn, Paul H. Weese of New Lexington, Ohio, and Richard L. Olson of Bloomington, Ill., and T/Sgt. Leolan H. Fry of Gerrington, Kan., the NCOIC.

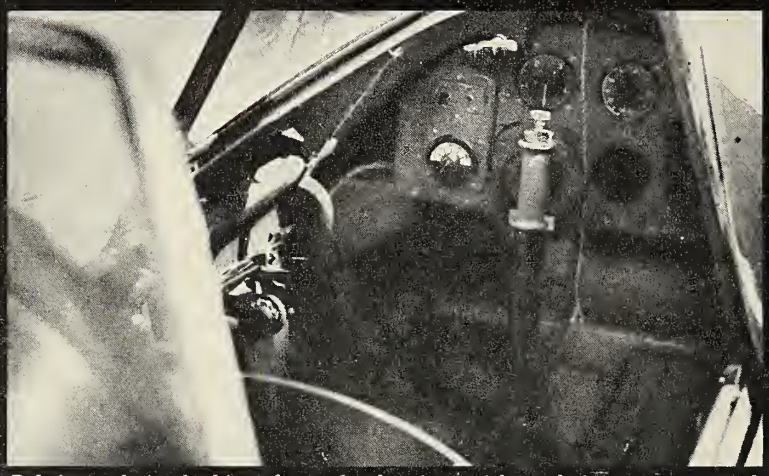
The group was allotted just enough of the critical radio equipment needed for carrying out normal operations. Receivers and transmitters had to be salvaged from reparable and secondhand units, since those for permanent stations had to go in with each task force. All the more powerful radio equipment was designed for installation on level floors, so all equipment had to be rebuilt or remodeled for mobile operation. Transmitters, rectifiers and modulators for the transmitter trailer weighed about 4,000 pounds; the trailer could carry a load of 3,000 which meant extra bracings. Transmitters and receivers soon burned out unless artificially cooled, so air conditioning was incorporated.

The trailer units were converted from two-wheeled house trailers of pre-war days which had been left in an AACS supply depot. A water-soaked transmitter, steel antenna, dozens of receivers, cables, switches, battered radio cabinets and other equipment were salvaged from scrap heaps. Aluminum from an abandoned Jap plane made good patching material for a banged-up trailer. Paint supplied by the Navy sealed up the cracks.

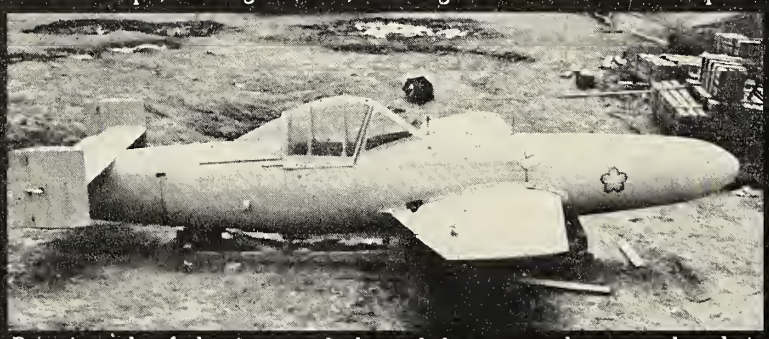
It was like making a P-38 engine out of a couple of jeep motors, but the first mobile unit began taking shape.

(Continued on Page 72)

Inside the Baka

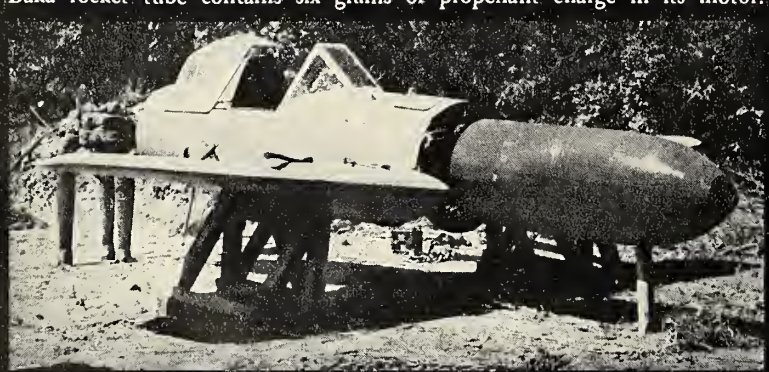


Baka's cockpit, looking forward, showing stick and instrument panel.



Baka is made of aluminum and plywood, has armor plate around cockpit.

Baka rocket tube contains six grains of propellant charge in its motor.



Fairing removed, showing mount and warhead which contains trinitroanisol.

Some technical data and flight characteristics of this Jap suicide plane

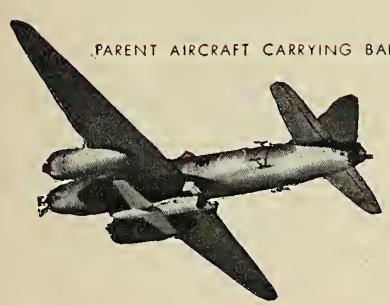
Pride of the Kamikaze corps, the Jap suicide rocket plane Baka ("The Fool") is a pilot-controlled flying bomb that carries 1,165 pounds of explosive in its nose and dives on its target at between 500 and 600 miles per hour. The Baka is usually carried under the belly of a Betty, although Liz, Helen, Peggy and Sally have been used, all with modifications, Attached partially in the bomb bay by one mounting lug and slings fastened under the wing and empennage, the Baka is cut loose from the mother plane up to 25 miles from target. Its range is determined by the altitude at which it can be released, but its weight and drag probably limit the mother plane to 20,000 feet.

Five rocket units propel the Baka, three of which are mounted in the tail cone, the other two slung under the wings. These charges may be fired either singly or simultaneously at the pilot's discretion. The Baka itself is guided by a conventional stick and rudder arrangement, and the pilot has at his disposal a selector switch for the firing of the propulsion charges, a pull-type arming handle for the base fuzes of the explosive charge, a compass, an altimeter, an airspeed indicator and an inclinometer. All control surfaces have dynamic balance arrangements to eliminate flutter at the high speeds at which the craft operates.

The explosive charge in the nose is covered by a streamlining cone. It has five fuzes, one in the nose and four in the base. The nose fuze is a straight impact fuze and is vane armed. Two of the base fuzes are straight impact and the other two are of the "all way" type. All four base fuzes are armed manually from the cockpit.

From nose tip to tail the Baka measures 19 feet, 10 inches, spans 16 feet 5 inches from wing tip to wing tip, weighs 4,537 pounds and can carry a wing load of 70.6 pounds per square foot. A post and ring sight is mounted on the nose nacelle for aiding the pilot in aiming the Baka at its target, but accuracy is poor because the pilots have no way to practice handling the bomb as it speeds in its suicide dive. There is no landing gear.

The Baka shown on this page, a member of the Cherry Blossom Unit of the Kamikaze, was found in a cave on Okinawa after our forces had taken over the island. A cutaway drawing appears on the opposite page. ☆



PARENT AIRCRAFT CARRYING BAKA

SPAN—16' 5" LENGTH 19' 10"
MAIN PLANE, HORIZONTAL & VERTICAL STABILIZERS OF PLYWOOD
FUSELAGE OF METAL CONSTRUCTION

PROPELLANT CHARGE
[6 GRAINS IN EACH ROCKET MOTOR]

NOZZLE

5/16" ARMOR PLATE

BASE FUZES ARMING HANDLE

ROCKET IGNITION SWITCH

INTERCOMMUNICATION SWITCH

TRAP

ROCKET IGNITION SELECTOR SWITCH

ROCKET MOTORS

SIMPLE ALTIMETER

COCKPIT ENCLOSURE RELEASE

COMPASS

GRID

IGNITING CHARGE

AIRSPEED INDICATOR

FORE & AFT LEVEL INDICATOR

IGNITER

OXYGEN

CIRCUIT TEST SWITCH

STICK FORWARD CONTROL

JUNCTION BOX

BRACING HANDLE

SPENSION LUG

BASE PLATE

PITOT TUBE

VARHEAD BODY

5/16" ARMOR PLATE

CHARGE
[TRI NITRO ANISOL]

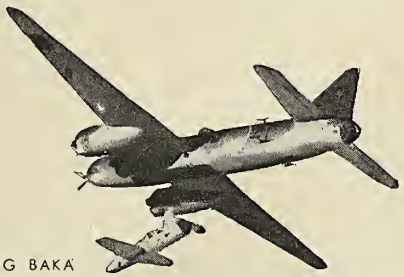
BATTERY

ARMING DEVICE

BASE FUZES
[2 IMPACT & 2 "ALL WAYS"]

LUMINUM PLATE

NOSE FUZE



PARENT AIRCRAFT DROPPING BAKA

So you want to own a light private plane after the war? Well, here are your prospects

That small, low-priced, cheap-to-operate airplane you've been thinking about for after the war is just around the hangar apron—but it's still expensive to own.

By mid-fall you can buy one. It will cost between $900 and $4,000 depending upon how much airplane you want. You can pay cash, or take advantage of some new aviation pay-as-you-fly financing. But for every hour you fly, count on spending about three dollars for gasoline, oil, engine over-haul and miscellaneous costs. Add to this an annual output of approximately $500 for storage, depreciation and insurance. For that figure, which will amount to about $1,200 a year, you can fly for two hours every Sunday or split it up into trips totaling some 8,000 miles, at an average cost of 15 cents a mile.

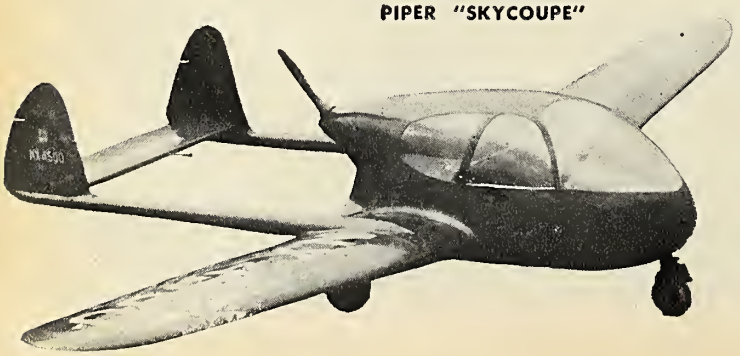
If you can afford that, you can own a plane. But don't expect too much from it. Utility is limited, chiefly because of the weather. When there are storms, you won't fly any more than you'd take a canoe out in a rough sea. Fog will ground all planes not equipped with expensive blind flying instruments which will cost as much as the plane itself. If you want to fly cross-country, plan on spending at least a couple of nights a week studying up on new rules and regulations and navigation. So what you're really getting (for the time being, at least) is a flying machine whose use is comparable to that of a motor boat—good for a short spin or a short cruise, if the weather is good.

In appearance, the first post-war light planes will differ little from pre-war models, but they will be sturdier, better built and have more horsepower. There'll be a plane to fit your personal desires. Fast little airport planes for the fighter pilot, who wants something that will zoom and zip like a Mustang, but do it on a minimum of gas. A side-by-side deluxe sport model having all the conveniences of a roadster. There will be enclosed cabin tandem run-abouts. The family aerial car, a four-place sedan model, built for cross-country pleasure or business. Amphibians tailored for the sportsman.

The typical private plane will have a wing span of about 35 feet so it can land between the parallel telephone poles along almost any highway. It will weigh about 1,300 pounds, it will have a 65-75 horsepower engine, simply built so that you can make some minor repairs yourself the same as you do on an automobile. Accommodations will include room for pilot and one passenger with a baggage compartment capable of carrying about 50 pounds of luggage. Its fuel capacity will average about 16 to 18 gallons —enough to take it 300 to 400 miles non-stop. Top speed will be about 110 mph; top ceiling about 16,000 feet, but there is no oxygen as standard equipment. It won't have two-way radio, wing slots and flaps, or even windshield wipers unless you pay extra.

According to the Civil Aeronautics Administration, the market for such a plane will be 10 times what it was before the war. Officials have estimated that at the end of the war there will be approximately 350,000 Army and Navy pilots, 150,000 civilian pilots and students, plus some 2,500,000 men and women trained by the armed forces in numerous aviation trades. Indicative of the trend are the 3,000 military pilots who have been applying weekly for their civilian wings.

PIPER "SKYCOUPE"



Plane manufacturers—big and small—have been deluged with letters from AAF men who want full particulars on owning and operating their own light plane. Now, with one war won, a brighter prospect for getting materials and a green light flashing in Washington, these plane builders are eager to open business. Already they have sales agencies set up in every state and they are holding certain areas for returnees who are interested in setting up their own airport businesses.

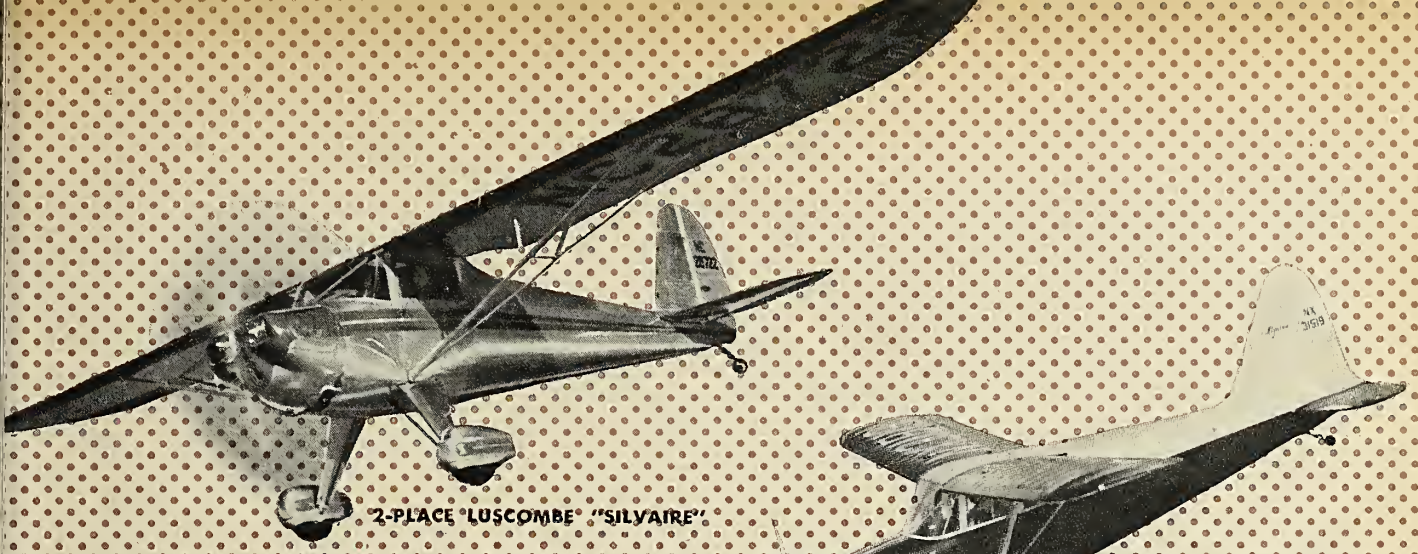
SKY

The pre-war light plane factory was like a toy shop, a small group of workers putting together one airplane. The post-war model is a machined creation. Big hydraulic presses require but a single operator to stamp out wing ribs—one every two or three minutes. The thin sheet of aluminum-alloy metal goes in raw, comes out a perfectly formed rib far stronger than the pieced-together wooden version. Arc-welding, introduced for the first time in light plane construction, makes possible instantaneous joining together of fuselage metal framework pieces. Expensive dies turn out cowlings and other specially shaped metal parts in the same way that car fenders are made. A machine that works like an automatic stapler fastens the cloth covering to the bare frame. Doped sections move along an overhead conveyer, pass through high-temperature driers.

These time-savers and others make light plane manufacturers confident they can and *will* turn out better and cheaper planes. First prices, however, will be about the same as the pre-war scale because money saved in production has been gobbled up by high wartime labor. But prices don't seem to dampen the enthusiasm for owning a light plane.

Out in Wisconsin, for example, an airport operator and plane dealer wired Republic Aviation, "Can I double my quota? Customers buying planes like they used to buy bicycles." He had sold more than 75 planes of a design that hasn't yet gone into production and he had the cash for down payments. Of equal significance, his customers, some of them servicemen, were buying a plane for use in their particular locality—an amphibian to use on Wisconsin's hundreds of small lakes and at the same time take advantage of airport facilities.

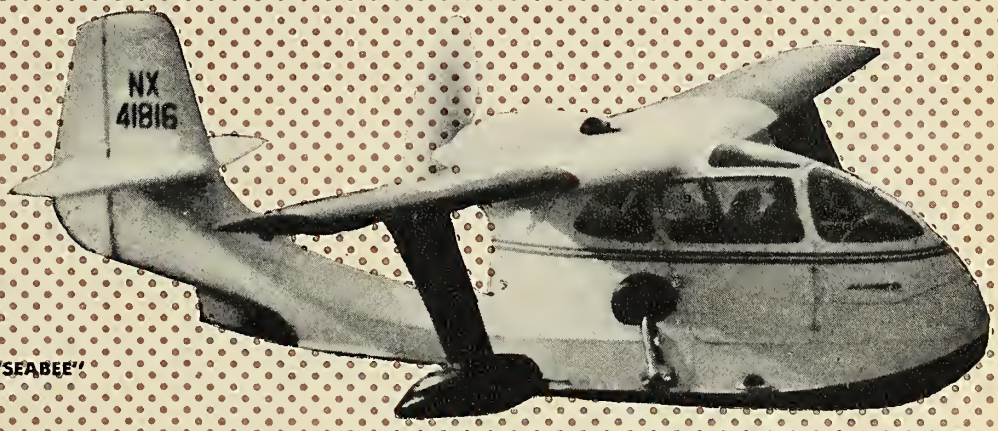
It was this sales point that the builders of the Thunderbolt had in mind when their engineers designed the much-talked about four-place "Seabee" amphibian, the plane that "can't be built for $3,500" but will sell for that figure—so they say. The secret, according to Republic's crack engineers, is a process they call "Elimination Engineering"—cutting down on the number of parts to lower production expenses. They took a wing panel from the "X" model and cut the number of pieces from 134 to 21 by beefing up spars, eliminating ribs and dimpling the stretched aluminum skin for added strength. The horizontal stabilizer that once had 42 pieces, now has 10 and the time-slashing formula is being applied to every major section of the airplane. On the stabilizer alone it means cutting the cost from approximately $6.25 a pound to less than 40 cents a pound. That's based on a production of



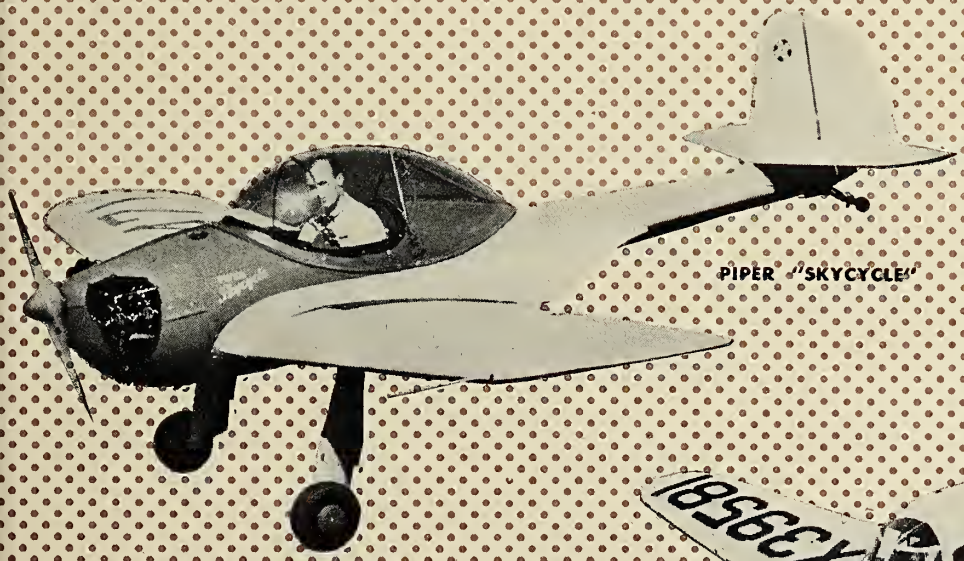
2-PLACE "LUSCOMBE" "SILVAIRE"

STINSON "VOYAGER" 125"

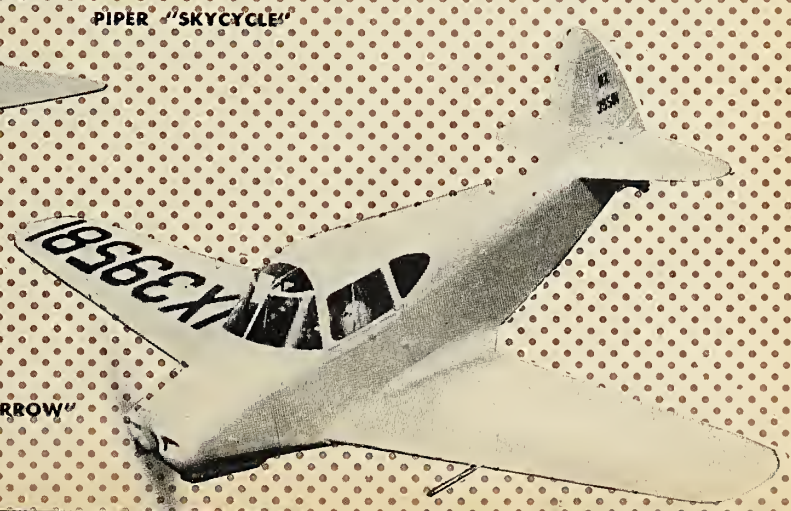
LIVVERS



REPUBLIC "SEABEE"



PIPER "SKYCYCLE"



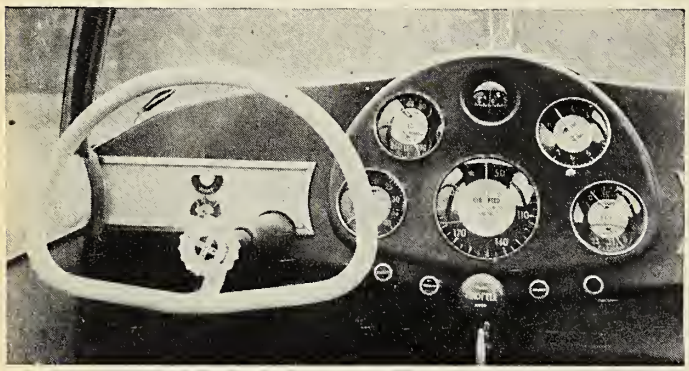
AERONCA "ARROW"

5,000 planes, but already the company has orders for more than 3,000 and these came within six months after they announced the model!

The "Seabee," for its price tag, is a lot of airplane. It has a roomy cabin with furnishings like a custom-built Chris-Craft. The engine, of 185-horsepower is a pusher, located behind the passenger compartment which accounts for the almost noiseless interior. An extra door in the extreme nose favors the fisherman, who can land on any small lake, open the door and drop a line just as you'd fish from a small yacht. A rugged all-metal hull permits landings in waves three feet high. One careless pilot, who forgot to put the gear down, landed on a runway with no more damage than scraping paint off the hull bottom. What's more, you can fly this 2,600-pound (gross) "duck" for five hours without refueling at a 105-mph cruising speed and there's the extra safety bonus of being able to land on any airport plus some 33,900 small lakes which have sufficient area for take-offs as well.

The spotlight for sales, however, is on the major pre-war light plane companies—Piper, Aeronca, Taylorcraft, Stinson, Luscombe, Culver, Rearwin, Ercoupe. What the flight-agers want is a conventional airplane, cheap and simple.

They will get simplicity. One pilot, who has flown most



The instrument panel of the Piper "Skycoupe" closely resembles the dashboard of an automobile. Note starter button at left.

every type of light plane, new and old, commented. "The design boys have made flying almost too simple. You make your feet do what your hands normally do on the steering wheel of a car. In the air, trouble begins when you go too slow, vanishes when you pour on the throttle. You climb and descend by the sound of the engine and the wind. You keep balance by the seat of your pants. If you can do that, you got wings."

There's a little more to it than that. It takes you about eight to ten hours before you "get that feeling" and can solo. After that there's about 50 more hours of getting acquainted before you can get a CAA ticket which entitles you to take up passengers.

One designer, Fred E. Weick, who built the Ercoupe ($2,590), a small, low-wing, all-metal tricycle job, made it even more simple. He linked the ailerons and rudder controls together, eliminating the need for rudder pedals and feet-hand coordination. All you have to do is move the stick or wheel to right or left for a turn and bank, or back and forth to climb or dive. It's the next best thing to push-button control. The Ercoupe also has a secret built into it that makes it impossible to spin—and getting into spins, the records show, has been the cause of most fatal accidents.

Something new and entirely different is William T. Piper's "Skycycle," the motor-bike of the light plane world. To get the first experimental plane, engineers took a large droppable fuel tank, mounted a light 40-horsepower engine in it, cut out a cockpit, added an extension boom for the rudder and elevators, hooked on a pair of wings and it flew.

The new model, which has a built-to-plan fuselage and a special set of new airfoils, looks more like an airplane. It has a 55-horsepower engine and a 10-gallon fuel capacity which can push it along at a claimed cruising speed of 90-plus for a range of 350 to 400 miles. It weighs less than 400 pounds empty, will carry up to 250 pounds, but its plush padded cockpit is a tight squeeze even for a guy who weighs 180. As one pilot said: "You don't fly it, you wear it." Some think, however, because it is tricky, fast, tiny and a one-man airplane that you fighter pilots probably won't hesitate to drop about $900 for a pair of wings to do some sky riding.

Bill Piper, who made the name "cub" synonymous for light plane, has some other new models, too, namely the *Skycoupe* ($2,000), a two-place low-wing, and the *Skysedan* ($2,995) for four people. But you probably won't be able to buy one for at least two years. It will take that long to perfect, tool-up and produce. For immediate sale the Piper post-war plane will be just a "Cub," an improved version of pre-war two-place and three-place trainers and cruisers.

One model of the *Skycoupe* is flying. It has a tear-drop shaped fuselage, automobile type doors and windows that give it the appearance of the plexiglass nose on a B-29. Unique for light planes is the twin-boom tail, pusher engine, retractable landing gear and self-starter. On the instrument panel you don't have to ponder over aeronautical terms like *altimeter, manifold pressure, bank and turn indicator*. It's all there on simple dials and knobs labeled—starter, throttle, primer, fuel, speed, oil, gas, compass.

Aeronca has a similar design called the "Eagle" which is now in the wind-tunnel and mock-up stages. Messrs. John and Carl Friedlander, whose company produced the first low-priced light plane, the "flying bathtub" in 1929, are planning to produce a two-place low-wing, the "Chum," which has that two-control, anti-spin feature adapted from the Ercoupe. They also have new and improved models of the popular pre-war two-place, side-by-side "Super Chief" and a new tandem trainer, the "Champion," which will be the company's first bid for postwar business.

The new "chief," which will sell for about $2,900, has better vision, metal ribs and sound-proofing, all of which were lacking in 1940 models. The landing gear is specially built so that the wheel and strut can be switched from side to side. Such a small item as handgrips on the struts have been added to facilitate ground handling. Brakes, like those on a P-38, but in miniature, permit short stops. Wing tips are removable and Aeronca men are thinking in terms of "replace" rather than "repair."

The closest thing to a family plane which is now ready for production, sweating out materials, is the four-place Taylorcraft Model 15, a four-door sedan. Not too unlike pre-war two-place Taylorcrafts, the new plane has a blown-up fuselage with two side-by-side seats in tandem. It will sell for about $4,000. Slots and flaps permit landing speeds as low as 40 mph. Removable rear seats allow large cargo space.

Stinson Division of Consolidated-Vultee Aircraft Corporation (B-24 parents) is also out to get the family business with a new four-place airplane. Although their big Wayne, Mich., plant is busy turning out liaison planes for the Army, engineers are ready with commercial design. The popular Stinson model will be the "125" built to accommodate pilot and three passengers. It looks like the three-place "105" pre-war design but has more horsepower, fatter fuselage and interior construction characteristics gleaned

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Three Years Over Europe

BY MAJ. ARTHUR GORDON
AIR FORCE Staff

In the long run, the story of the part played by American airpower in the European victory cannot be told by the generals, or the military analysts, or the war correspondents, or even the historians, however gifted they may be. It will be told by the AAF men who were there, the men who made the history—all 875,000 of them who survived. For years to come they will be telling it, in corner drugstores and barber shops, at family dinners and barbecues and clambakes and wherever people talk about the war. They will tell it as honestly as they can, and for their listeners that will be the last word on the subject.

This review of the AAF in action over Europe does not pretend to be a complete historical record or an exact appraisal of what airpower accomplished. Its scope is too small, and it is written too close to the event to have the full wisdom of hindsight. Its purpose is simply to help the participant tell his story better by giving him a somewhat broader picture of the whole than he might otherwise have. If he understands some of the basic reasons and principles that underlay his own action, if he can see that action in its proper perspective, he will be able to tell the story of airpower with more assurance, accuracy, and conviction. The story needs to be told and re-told, lest in years to come complacency and inertia once more rob us of our strength. It does not require any special selling. The record speaks for itself; the facts are more than sufficient. The best testimonial to the importance of airpower in our national life is simply the plain unvarnished truth.

'The destruction of Germany's great war industries was accomplished almost entirely from the air. No one can stand among their ruins without a feeling of awe for the devastating power of such attacks. The courage and skill of our pilots and their crews in these operations is legendary. They deserve the highest tribute of our people.' THE HONORABLE HENRY L. STIMSON, SECRETARY OF WAR

When the Nazis surrendered unconditionally at one minute past midnight on May 9, 1945, the gods who love irony must have laughed. The nation that had first counted on airpower to bridge the perilous gap between its aspirations and its capabilities, then used the air in revolutionary ways to conquer a continent—there was this nation, shorn of its air strength by superior airpower, its cities beaten into dust and ashes, its industry crippled and driven underground, its armies rendered powerless to halt the march of the invaders.

The Germans themselves were more than willing to admit that airpower had boomeranged on them with terrible impact. In the weeks after V-E day one top Nazi general after another added his voice to the almost unanimous chorus: "We failed primarily because your airpower robbed our skies of protective wings, our armies of mobility, our tanks of oil and our factories of raw materials." This from the men who had counted on air weapons to lead them to world domination. Irony indeed.

For the laughing gods, however, the irony must have been the sharper for the narrowness of the margin of failure. More than once, even after American strength was thrown into the balance, the Germans nearly won the air war. Given a little more foresight, they might have created a single-engine fighter force that would have halted our air invasion of Europe. Given a little more time, a little more luck, they might have brought their V-weapons and their jet planes to a point where they could have forced a stalemate. But as one of their airmen remarked bitterly after his capture, their timing was consistently bad, their critical decisions on how to apply their strength were usually made too soon or too late.

This was most unfortunate for the Germans. It is the application of power, not power itself, that decides battles. Thinking, not sheer mass of planes or tanks or guns, is what wins wars. In the air, where there were few precedents to follow, few textbooks to study, the side with the best brains was bound to win.

It did.

The victory was so enormous that it was hard to grasp at first. To the men of the AAF who did the flying in the ETO, and to the men on the ground who handled the countless small anonymous tasks that kept the planes aloft, the days immediately after V-E day were touched with a strange unreality. There was both pride and bewilderment in the face of victory. Pride in the magnitude of the achievement, reflected in the price that was paid—8,314 heavy bombers lost in combat, 1,623 medium and light bombers, 8,481 fighters, 38,185 men killed or missing. And bewilderment because the scope of the effort seemed so vast as to defy comprehension. "We did it, all right," said one crew chief, "but we'll never know exactly how."

In a way, the crew chief was right. Nobody will ever know exactly how the AAF applied the aerial power without which the war could not have been won. In war, as somebody once said, truth is the first casualty. Not necessarily because sinister forces try to hide it, but because it is so hard to pick out from the mass of irrelevant detail.

The story can be told in outline, however, and the main threads of the narrative are not tangled or confused; they are quite clear.

From the beginning the mission of Anglo-American airpower was to weaken the German will and means to wage war to a point where successful landings could be made on the Continent, then facilitate the destruction of the German armies by our own. To accomplish this mission, it was necessary to cripple certain key German industries. Before that could be done, it was essential to neutralize the Luftwaffe and retard the development of German countermeasures such as the V-weapons that threatened the success of the whole plan. But the broad strategic mission was plain: set the stage for invasion, then facilitate exploitation by the ground forces. Everything that the AAF did was directed to this end, with the comforting knowledge that every blow struck against the Nazis directly or indirectly aided the Russians on the gigantic Eastern front.

There was not, it is true, always complete agreement as to the methods by which this mission was to be accomplished. We made errors of judgment which are easily discernible by hindsight. We underestimated German ingenuity in repair and salvage. We may have been too sanguine about the ability of heavy bombers to protect themselves against improved fighter tactics. We were slow to grasp the full importance of photo reconnaissance—and night photo coverage never was adequately developed. We bit off more than we could chew in the way of target systems—partly because overall war strategy necessitated diverting heavy bombers to another theater early in the war. The task of neutralizing the V-1 sites was particularly difficult, and the first results left much to be desired, although the net result probably saved London. Our early airborne efforts were not the smooth operations of 1944 and 1945.

But these were just grammatical errors compared with the grievous blunders the Germans committed in their use—or rather misuse of airpower. The Teutonic mind, capable of brilliant short-range planning and revolutionary engineering, seldom showed the imagination and foresight that would have enabled the Nazis to exploit their initial advantages. They failed in the Battle of Britain and in their attempts to blockade the British Isles. They failed in their final defense of the homeland more because they planned their air defenses too late than because of any material or mechanical deficiency.

This was not true of American planning. In the broad application of airpower, our basic ideas were sound, although in some cases we seemed to be flying straight into the teeth of the best air doctrine. The proof of the pudding was in the eating thereof. The fact that we were eating the pudding less than three years after our recipe went on the stove is one of the most extraordinary military achievements of all time. It is, moreover, a testimonial to our air thinkers who had been teaching certain basic doctrines in our military schools for 15 years prior to the war.

How those somewhat academic doctrines were tested in the battle laboratories of war is a long story, but if it is ever dull that is the fault of the story-teller. The individual

participant, immersed in his particular task, was in no position to see the air war over Europe as a gigantic chess game in which one move was countered by another, one tactic brought forth another, with the issue actually in doubt until superior power and more intelligent application of that power brought the final checkmate. But it was.

One thing that makes the story fascinating is speculation about what did not happen. The might-have-beens of war are not unprofitable to contemplate, for we may be sure that our enemies of the future will not neglect the study of them. If the Germans had not changed target systems at least twice in the Battle of Britain; if they had moved through Spain to pinch off the Mediterranean at Gibraltar; if we had allowed ourselves to be dissuaded from our determination to carry out daylight precision bombing; if the Germans had developed an adequate sight for their rocket-throwing fighters; if our long-range fighter escort had not appeared exactly when it did; if the V-weapon timetable had not been dislocated and retarded by our bombing—all these ifs and many others are pregnant with military potentialities. What happened is most significant in the light of what might have happened.

There are a thousand ways to attempt to tell the story of the part airpower played in the European victory. There is the statistical method. But statistics have a way of becoming merely astronomical figures that do not tell the whole story. Besides, they indicate only size, and size was not the deciding factor. The statistics are all on record for those who want them. There is, too, the familiar distinction between strategic and tactical use of airpower. But the distinction is misleading; certainly a high-altitude, long-range daylight mission to Berlin involving sky battles that cost the belligerents several hundred planes is a tactical as well as a strategic operation. And certainly the work of a long-range fighter bomber, bombing an enemy headquarters 200 miles behind the battlefield, has strategic as well as tactical significance. The line of demarcation is not at all clear. Besides there are countless air activities, from vertical envelopment to air-sea rescue, that do not fit in either category.

The best plan, probably, if the larger picture is not to become blurred with too many details, is to attempt to trace the chronological counterpoint of offense and defense from the beginning—or even a bit before the beginning—to the end. Let us, therefore, think back to the uncertain days of 1941 when our country was technically at peace but when, actually, the hot breath of war was on our necks, with the reality of conflict only weeks away.

By July 1941, the international situation in which the United States found itself was so critical that the possibility of a two-ocean war had to be faced and all possible preparations made for such an eventuality. Consequently the President asked the Secretary of War for a report on our military plans and capabilities. That report undoubtedly played a large part in the discussions that took place when the President met Mr. Churchill on the battleship King George V one month later—a meeting that resulted in the Atlantic Charter.

The air section of the report faced squarely the fact that there could be no invasion of the Continent of Europe for at least three years (the authors of this estimate were correct almost to the day), and then only if the war against Germany were given priority over a possible conflict with Japan. The broad recommendations of the air chiefs, which in the next 40-odd months were followed with amazing fidelity, called for a concentration of our air effort against Germany's war potential from bases in Britain with a defensive or holding war in the Far East. The report did not foresee the disasters that were to overtake us in the Pacific, but many of the difficulties of daylight operations over Europe were anticipated. The necessity for more armor and more firepower in our heavy bombers and the need for long-range fighter escort were clearly indicated—this in the days when we had a grand total of 70 heavy bombers fit for combat and, except for the untried Lightning, no long-range fighters at all.

There were misconceptions in this pre-war report. There were bound to be. The electrical system of Germany, given highest target priority by our planners, subsequently proved less vulnerable than anticipated. So did such communications as canals and marshalling yards once Germany developed her repair system to such a fine art. The German transport system did not begin to collapse until mid-1944—and then only under the impact of very intensive and sustained bombing. We were optimistic about our bombing accuracy under combat and European weather conditions. We overestimated the destructive power of high explosive bombs on certain targets. The report did not concern itself with airborne operations or even with strictly tactical application of airpower in cooperation with ground forces.

American faith in a discarded concept of air attack

But the startling thing about the report was the fact that it was based on a concept of air attack that flatly disregarded the lessons of air warfare learned over Europe in the two previous years. It assumed that the backbone of American airpower would be the daylight heavy bomber—a weapon both sides in Europe had discarded after bitter experience as too costly a means of waging war. This must have been forcibly pointed out to Mr. Roosevelt at his August meeting with Mr. Churchill, yet he had enough faith in his American advisers to go ahead with preparations for such an offensive. Without this faith the European war might be in progress right now.

In August 1941, the AAF was hardly ready to engage in global war but it was not totally unprepared either. In April 1939, an expansion program had been inaugurated providing for 5,500 airplanes. A stepped up training program for aircrews and ground crews had been initiated. Orders for military aircraft from Britain and France had resulted in an expansion of our production facilities. When France fell, the President had called for a production of 50,000 airplanes per year. In 1941, the training program was increased to provide ultimately for an AAF of some 640,000 men. This was not ideal, but it was a far cry from the public indifference and inertia that hampered such expansion during the complacent '30s. If we had had in 1941 the airpower that AAF commanders had long been clamoring for, the war would have ended much sooner and countless lives would have been saved.

When war finally came, the Air Forces were shifting from first into second gear. The foundation for expansion was laid. Yet when the Japanese struck in the Pacific they virtually wiped out our overseas air arm. And within the continental limits of the United States at the time of Pearl Harbor, there were only 631 airplanes suitable for combat.

One week after Pearl Harbor, a plan for an Army air force of 90,000 planes and 2,900,000 men was complete. Ten weeks later the vanguard of the 8th Air Force was in Britain. Six months later, in June 1942, a token force of 13 Liberators flew 2,000 miles from Africa to bomb the oil refineries—prophetic target—at Ploesti. Of these pioneer Liberators, only 4 planes returned to their starting point. The British must have had to bite their tongues to keep from saying "We told you so." The Germans must have relaxed a bit. The real test was yet to begin.

It did not begin until August 17, more than eight months after Pearl Harbor. Before discussing the tactically unimportant but historically portentous flight of 12 Fortresses to Rouen, it might be advisable to recall the air situation as it existed in Europe during the summer of 1942.

Of the five air forces that had participated in the European war up to the arrival of the AAF, one was extinct, one was a farce, one was a battered enigma, one had won the most important defensive air battle of the war and was building a powerful night striking force, and one—still the largest and most formidable—was heavily committed from the Arctic Circle to the Sahara and from the English Channel to the gates of Moscow. These were the French, Italian, Soviet, British and German air forces, respectively.

The air situation in Europe in the summer of 1942

In mid-summer of 1942, the four surviving European air forces still showed strong traces of the original thinking that had gone into their composition, although the RAF and the GAF were changing rapidly to keep pace with the trends of the war itself. Each of the four had been designed to fit requirements of its own country; each was a mirror, in a sense, of the ambitions and intentions of the people who built it.

Italian airpower, which had looked threatening before the war with its reasonably good but underarmed fighters, its torpedo and dive bombers, its creditable record in the Schneider Cup races—and the first publicized jet-propelled flight, for that matter—had never shown much enthusiasm for real fighting. Its brief appearance in the Battle of Britain had ended in ignominious rout. Its record in Africa was somewhat better but not much. The Italian air force was parceled out to ground commanders and destroyed piece by piece. At best, like the Italian navy, it had maintained a nuisance value, and that was rapidly disappearing.

The Soviet Air Force, virtually destroyed by the GAF in the campaign of 1941 and sorely battered again in 1942, had somehow managed to survive—bolstered by its own reserves and American help—to the point at least where there was fighter cover for key cities. Within a few weeks, in a struggle reminiscent of the Battle of Britain, this fighter force was to exact a heavy toll from the Nazi Bomber Command's daylight efforts to reduce Stalingrad.

The Soviets had never gone in for long-range bombardment. Perhaps they knew our plans and assumed we would take care of it. In any case, by this time they were pushed too far back for such a program to have made sense, even if they had had the production facilities or the planes. With much of their industrial area overrun, they were forced to concentrate on types of planes that could give maximum support to their greatest asset—manpower. One result was the Stormovik, a heavily armed fighter-bomber which the Soviets used more or less as a flying tank. An effective ground support weapon, it was not conceived as a match for the best German fighters in aerial combat. Except locally, German air superiority on the huge Eastern front at this stage of the war was complete.

The RAF, at this point, was in a transitional period. Designed as a purely defensive weapon, its primary mission had been to hold the British Isles at all costs, prevent invasion and protect the vital shipping lanes. Fighter Command, aided by radar, German miscalculation and its own magnificent fighting qualities, had won the Battle of Britain—and with it time for the United Nations to set about winning the war. Bomber Command, significantly, had directed its first attack against a Nazi naval base, and up to mid-1942 had dropped most of its tonnage on the German Navy or the bases that supplied it.

With the aid of Coastal Command, the two commands had helped avert the threat of invasion. When the Americans first appeared over Europe, Bomber Command was patiently building up its strength for shattering area attacks by night. It had tried no sustained daylight operations since some disastrous losses in 1939. Like the Germans, it had been forced under cover of darkness by the threat of flak and fighter interception. It was painfully perfecting the pathfinder technique that later resulted in some very accurate night bombing. But many months of trial and error and bitter losses lay ahead. And between Bomber Command and that perfection still stood the Luftwaffe, with its expanding production facilities turning out a constantly increasing stream of night fighters.

The GAF at that time had about 4,500 first-line aircraft —a number that remained remarkably constant throughout the war, although the proportion of fighters to bombers mounted drastically as time went on. It had already proved itself a formidable weapon. It was, as has been said, the instrument upon which Germany depended to neutralize the overwhelming predominance in size and numbers of the coalition that she knew was bound to rise against her.

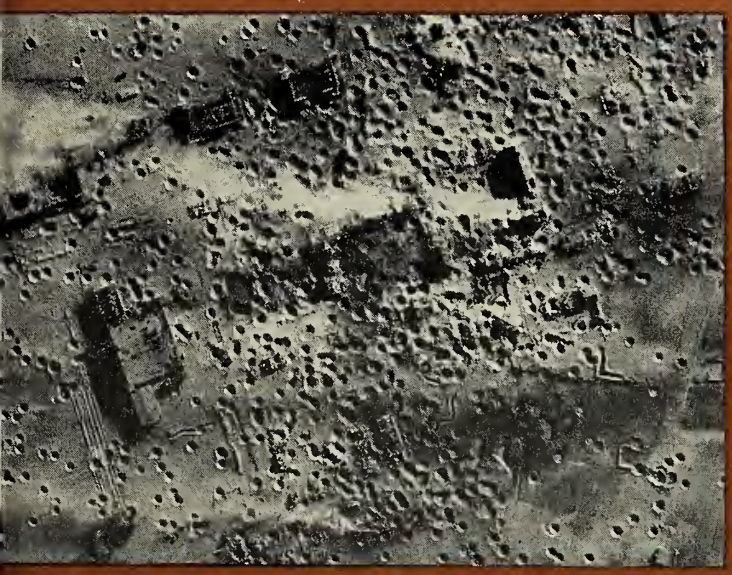
In August 1942, the GAF's record was impressive. It had enabled the German armies to overrun Poland. It had neutralized British seapower in the conquest of Norway. Its Stukas had demoralized the French and facilitated the break-through at Sedan. It had cracked the stubborn Greek resistance and hurdled the sea-barrier before Crete. It had virtually severed Britain's Mediterranean life line and was giving solid support to Rommel in his drive to the gates of Egypt. In Russia it had helped to drive the Soviets back to the approaches to Moscow and the Caucasus.

It had, in fact, only three blots on its record: the Battle of Britain and the failures at Malta and Moscow.

In all three cases, significantly, it was the German bomber rather than the fighter force that failed, and each time in the face of determined fighter opposition. Truth was that the GAF had started out primarily as a close support weapon, a sort of flying artillery arm geared to short intensive ground campaigns with periods of rest and refitting during winter months. Even reconnaissance was mainly a short-range affair. As such, it had succeeded brilliantly. But it came to the Battle of Britain with no carefully thought-out plan either of blockade, with long-range attacks on shipping and short-range attacks on harbors, or of effective neutralization of the RAF's fighter command. Actually, it had vacillated between the two, changing target systems from the docks and channel shipping to the few fields that serviced the Hurricanes and Spitfires, and finally in blind fury to the senseless blitz of London. Its fighters made the further mistake of flying close instead of area support so that the British were able to vector their fighters straight to concentrated targets. Apparently German intelligence was not well informed on British radar and how it functioned. When asked by Allied interrogators after the war why these mistakes had been made, Goering said that the bombers were so lightly armed that they had to have close support. As for changing target systems, Goering tried to throw the blame for the assault on London upon Hitler who, he said, ordered it in revenge for the bombing of German cities.

In any case, the Battle of Britain gave the German bombers a jolt from which they never fully recovered. They did good work in the Balkans and paced the panzers into Russia and figured prominently in the battle for Stalingrad. They virtually closed the northern shipping routes to Russia. But they were never able to force a decision at Malta, or chase the British fleet out of the Mediterranean, or even hamstring the endless Russian retreat. They could

Classic example of early precision bombing was this bullseye attack on the Italian cruiser "Trieste" as it lay in an antisubmarine net at La Maddelina, Sardinia. At left, a cluster of bombs from our heavies drops toward target; hits it dead center (2); sinks the cruiser (3).



Airdrome destruction at Neuburg, Austria, was part of campaign to neutralize Luftwaffe. Recce reports showed 30 planes destroyed.

Bomb blasts mingle with enemy smokescreen as 15th Air Force Liberators strike Austrian railyard, an important strategic target.

Damage done in the early days to sub pens, such as these at St. Nazaire under attack by our heavies, did not come up to expectations.

and did operate effectively in daylight only in the absence of fighter opposition—and then their work was more tactical than strategic. The Germans still clung to their concept of the air as a medium for ground support.

When the Americans began their air experiment in daylight bombing, therefore, the clearest doctrine that had emerged from the air war was the superiority of the day fighter over the day bomber. It had been tested over the beaches at Dunkirk, in the Battle of Britain, in costly RAF assaults on Germany, in the skies over Malta—and was apparently receiving final confirmation over Stalingrad.

That was one truism.

The other was that no ground force could launch a successful offensive against tactical air superiority. The fact that the ground force possessing such superiority had always—up to that time—been victorious had led some observers to the fallacious conclusion that air superiority *invariably* brought ground success. This was to be disproved later in Russia, at Cassino and elsewhere. Indeed, conservative airmen never claimed any such thing. But in the fighter vs. daylight bomber question, the preponderance of evidence was all on one side.

It was all against the bombers that had been used up to that time—slow, underarmed instruments of dubious accuracy. The Americans had two new contributions to make—a bombsight so accurate that good daylight results were obtainable from an altitude above the level at which flak was prohibitive, and a bomber sufficiently well armed to protect itself against the type of fighters then dominating the skies over Europe. More or less by force of circumstance and geography, American airpower had developed along lines that led it inevitably to the one place in air war that no other air force cared even to claim. Our B-17s and B-24s, conceived originally as a defensive weapon that would enable us to meet an invading fleet far at sea and sink it by precision bombing from above effective flak level, seemed to have the qualifications for that power. And American industry had the capacity for providing the B-17s and B-24s in the necessary quantities.

The British were frankly skeptical. They had given the matter much thought, and had finally put their faith and national effort into night bombers. They had flown early models of the Forts over Europe and had lost several. As early as April, they had tested a B-17E and written a report from which they drew several gloomy conclusions. The defensive firepower, they said, was too weak to afford reasonable protection, the tail gun position being cramped and the ball turret very awkward. They also pointed out that the bomb bay could not carry block-busters and that the bomb load was small compared with that of a Lancaster.

The American reply to this was that improved accuracy would more than balance the lesser bomb load. As for the armament, certain modifications were being made. Switching from day to night bombing was a vastly more complicated procedure than simply taking off after sunset instead of after sunrise. Furthermore, night technique at that stage of its development offered little hope of smashing the GAF in the nest. And unless this was done, a swarm of planes would be hatched that might make invasion an impossibility.

The first Britain-based test came on August 17 when 12 Fortresses flew with Spitfire escort to Rouen, bombed the marshalling yards and returned without loss. This mission, and the longer unescorted bombing runs of the weeks that followed, were mere military pin-pricks in the thick hide of the Germans, but for anyone who could read the signs they were among the most important events of the whole war. The question was not whether we were doing serious damage to the submarine pens at St. Nazaire and Brest and Lorient. The fact is, we were not. The question was whether or not the Luftwaffe could destroy or turn our unescorted formations from our objectives as the Spits and Hurricanes had either shot down or turned the Dorniers and the Heinkels from their British targets two years before. This was the 64-dollar question because in all the arsenal of democracy the only weapon that could possibly neutralize the Luftwaffe was American strategic bombing. The Germans did not fully realize this in the autumn of 1942, but the success of the unescorted American heavies did shake their faith—secure until then—in a defense based mainly on radar, flak and fighter interception.

As early as the spring of that year, before an American heavy bomber had even reached an 8th Air Force base, the German high command had begun shifting aircraft production from bombers to fighters. In December 1941, that proportion had been 510 bombers and 130 fighter - bombers to 360 single-engine fighters. Two years later the figures were 400 bombers, 255 fighter - bombers, 600 single-engine fighters. By December 1944, single-engine fighter production was 1,425, twin-engine fighters 245, and bombers 15!

From the start the Germans developed a healthy respect for the firepower of a formation of Fortresses. After one laggard, crippled Fort took on a flight of ME-109s over Holland, shot two down and damaged others, the word went out over the grapevine (we have a German PW's word for this) to "lay off those verdammt Forts." But it wasn't long before heavier armament had been installed in the Germans' two basic fighters, the FW-190 and the ME-109, and intensive study of shot-down Fortresses had resulted in improved tactics in attacking bombers.

Compared to the sky battles that came later, those air engagements were small, but they lacked nothing in ferocity, and the caliber of the Jerry pilots was probably higher, on the average, than it ever was again. They were fighting over territory controlled by their own armies; in most cases the Americans were flying unescorted. If there was ever a time when everything favored the Germans it was then.

We were not yet prepared to fight every day—or even as often as weather permitted. If we had tried to at that time, our loss rate possibly would have exceeded replacement rate so drastically that the whole daylight offensive would have been jeopardized. Knowing this, the commanders carefully husbanded their strength. There are those who still claim that we should have waited until we had the planes to mount a really telling offensive, overwhelming German defenses before they could recover from the initial shock of surprise. There are several valid answers to this. The first is that we could not have mounted a major offensive, even if we had had the planes, without the experience gained from trial and error in these early missions. Our first large air battle was fought over Lille on October 9. There was, as

might have been expected, an element of confusion. Some squadrons missed rendezvous, some brought their bombs back with them, and there were conflicting claims of fighters destroyed. Such confusion was a necessary preliminary to the cold, almost uncanny efficiency of operations of 1944 and 1945. We learned that our planes had to be modified in some respects and our training of crews intensified before we were ready for large-scale action. The Germans learned much from our early strikes and improved their defenses accordingly. But we learned far more.

The second reason why delay was inadvisable had to do with morale. The United States had been in the war for three quarters of a year. Britain needed the lift that would come from the announcement that a powerful new ally was actually fighting beside her. America needed the sense of participation that such air strikes would give.

Finally, there was no point in waiting for a rapid build-up of bombers in Britain, because the course of the war had dictated a change in overall strategy which meant that no such build-up could be achieved for several months. That change resulted from the decision to invade Africa.

Operation *Torch*, as the African invasion was called, was dictated by the activities of a man then known as the "Desert Fox"—Rommel. As his panzers clanked forward on the dusty coastal road that led to Alexandria, the situation in the Mediterranean grew more critical. To those on the Allied side responsible for the conduct of the war, it became increasingly evident that he must be stopped. The worst thorn in Rommel's side was Malta. If Malta fell and Rommel's supply lines grew stronger, then there was every probability that Egypt would fall too. With Egypt would go the Suez Canal and the Middle East. The Germans would flank the Russians, win the Caucasian oil which they so desperately needed, possibly link up with the Japanese in the Indian Ocean. By July 1942, the consequences of not stopping Rommel were so obvious and so grave that earlier plans had to be shelved. Our Britain-based air offensive would have to struggle along as best it could, without the services of some of its most experienced squadrons and—even more disheartening—without the Lightning fighter cover originally scheduled to escort the heavies to worthwhile targets in Germany.

At the time of *Torch*, American airpower was already represented in Egypt by the 9th Air Force. At the start of the battle of El Alamein, October 23, 1942, it had 164 aircraft consisting of a squadron of Fortresses, a squadron of Liberators, two P-40 groups and one B-25 group. These, plus British air strength of some 1,100 planes, were opposed by about 2,000 Axis planes of all types. The Luftwaffe had its hands full dealing with these guardians of Egypt. It was not equal to a heavy assault on its rear. The responsibility for that assault was given to the 12th Air Force which landed with the invasion forces on November 8.

Torch differed sharply from subsequent invasions in that it was directed against territory held by a power that was semi-friendly, or at worst only half hostile. Adequate air cover, it was thought, could be provided from carriers and nearby Gibraltar. There were two operational plans for the invaders, a war plan in case the Vichy forces resisted, and a peace plan in case they did not. The uncertainty as to which plan would be followed persisted until a few hours before H-hour.

For the invasion, an American paratroop force was flown from Britain in 39 C-47s in the first American airborne operation of the war. Their story is worth recalling because it indicates the growing pains incident to any new project, in peace or war, and because it was the small seed from which grew the great vertical envelopments later in Normandy, in Southern France, in Holland and across the Rhine.

The planes took off on the night of November 7, expecting to receive a friendly welcome in daylight the next day. The flight down was a rough one. Most of the planes had been undergoing modification until a matter of hours before take-off. In some planes, wingtip lights burned out, making formation flying in the wretched weather almost impossible. When the C-47s finally reached Africa, they found severe fighting in progress. French fighters raked the defenseless transports with machine-gun fire, forcing several to crash-land in the desert. These were some of the difficulties but even so the operation had a measure of success inasmuch as the scattered arrival of the C-47s thoroughly confused the French air defenses and had them tilting at shadows.

North Africa: the proving ground for Allied tactical airpower

On the whole, air opposition was light. Spitfires from Gibraltar made short work of such Dewoitines as offered resistance. Carrier-ferried P-40s swooped onto captured airfields. Within a day or two some heavy bombers, including the "veteran" 97th Group from England, were moved in. Mediums and fighters also arrived to begin the long task of hacking at Rommel's rear guards and his supply lines.

Living conditions faced by these airmen were rugged, to put it mildly. Ground crews performed miracles of ingenuity in keeping aircraft operational in a climate that seemed to consist of a diabolical combination of dust storms and bottomless mud. Missions were flown at short notice, with organization improvised on the spot. Fighter pilots attended bomber briefings to get a picture of the type of mission they were being called on to escort. Troop Carrier dropped the paratroops that captured Bone airdrome, flew countless air supply missions, learned how to operate on a shoestring.

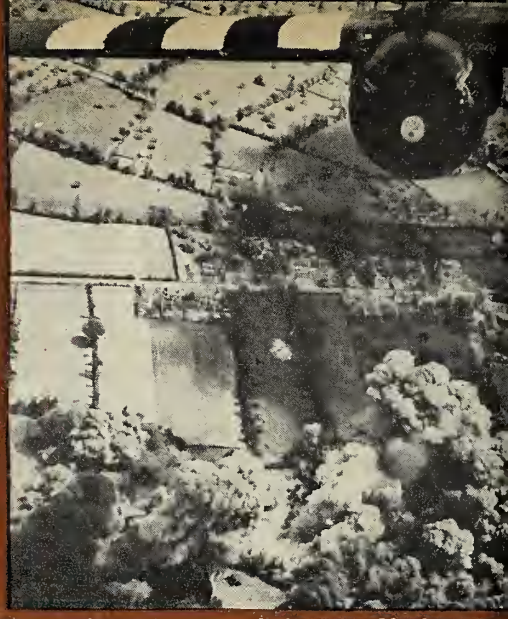
But even in those early days, the pattern of tactical support was emerging precisely as predicted by the logicians in the pre-war classrooms. First: gain air superiority. Second: isolate the battlefield. Third: provide direct cooperation with the ground forces in the liquidation of the enemy. The success of the second phase depended, obviously, on the first. Without air control there could be no interdiction of the battlefield. And until the battlefield was isolated, close cooperation could have no more than local effect. All this the air planners knew already. The African campaign was to teach them how to apply that knowledge successfully.

Air superiority was not gained in a week, or a month. At the time of the African landings, the embryonic 12th Air Force consisted of 551 aircraft. There were 1,700 miles between it and the other jaw of the Anglo-American pincer. And the Luftwaffe fought hard. But the truth was that the GAF at this moment of its greatest territorial expansion was simply stretched beyond the limits of its capacity adequately to supply itself. Committed to major efforts in both Russia and Africa, with the growing weight of the RAF's night assault oppressing its cities and the AAF's Britain-based day offensive already casting an ominous shadow, its doom in Africa was sealed from the moment our landings succeeded. The Germans must have wondered in bitter afterthought whether their African squadrons, pulled out in time, might not have tipped the scale at Stalingrad.

At the time, their faith in Rommel was so high, and stakes for which he fought so glittering, that any such admission of defeat was out of the question. So they fought on, until the harbors of Tunisia were choked with ships sunk by the AAF, and the desert battlefields littered with the skeletons of more than 1,000 of their first-line aircraft.

While the North African campaign was slogging through the mud that marked the end of 1942, our daylight bomber effort from Britain had reached a virtual standstill. In December, exactly four missions were flown. This was not

Scenes like this became commonplace as American bases sprang up throughout England.



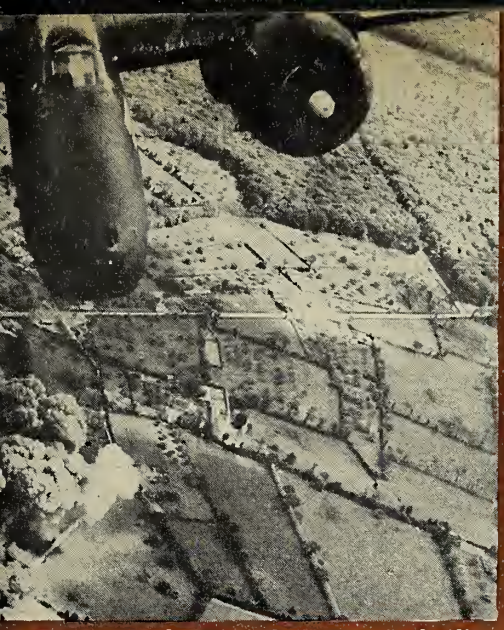
Havoc blasts enemy supply lines on Cherbourg as

This attack on flak-covered Ploesti refineries helped reduce the Nazi oil output 93 percent.

Constant patrolling by mediums prevented adequa

Supply site for V-bombs is spotted by 9th Air Force planes and put out of commission.

Wesel, Germany, focal point of American force



campaign to weaken Nazis during invasion landings.

German photo records destruction at Fieseler aircraft plant during 8th Air Force attack.

cement of badly sagging German defense positions.

Airborne lifeboat descends to B-17 crew down in North Sea after mission over Germany.

rossed the Rhine River north of the Ruhr Valley, shows effects of large-scale bombing attacks which preceded the Rhine paratroop operation.

altogether due to weather, although the weather was bad. It was primarily because we did not have the aircraft available. There were four groups operational in those bleak days —three B-17 outfits and one B-24 group—and for the moment they were orphans of the war. The requirements of the African campaign were such that expanding our force in Britain was out of the question; its replacement rate barely equalled combat losses, which were mounting as the Germans improved their fighter tactics and as the American heavies moved out of the effective but very short-ranged Spitfire protection.

As for the damage the heavies were doing to their targets —primarily the submarine pens—it did not come up to expectations, to say the least. The concrete pens at Lorient, Brest, and St. Nazaire, with their 12-foot-thick roofs, were proof against any bombs being used at that time. Furthermore, bombing accuracy under combat was in its early stages. Our bombardiers, who could hit a 100-foot circle from 20,000 feet in the quiet sky over Lake Muroc, were only learning how to do the same thing over German-held Europe with the skies full of flak and hostile fighters.

However, from the point of view of the planners of the daylight offensive, optimism at that stage of the game was not entirely amiss. Too much stress had been placed on the limitations of daylight bombing and there had been a lot of publicity focused on its growing pains. Optimism was actually necessary to maintain opposition to critics who, in all honesty, favored the switch of the American air effort to night bombing. Their attitude was based not so much on the belief in the superiority of night bombing as doubt whether day forces could survive fighter opposition. This was the crucial question, and at the time of the Casablanca conference in January, 1943, there was no proven answer.

The men who commanded our British-based Fortresses and Liberators, however, were convinced that a switch to night operations would be disastrous. Despite the limited scope of their operations, they had accumulated evidence to document their theories. Some of the evidence was invisible. The uncovering of German field armies in Russia and Africa to meet the new air threat from the west, the decline of the GAF bomber forces to meet the demand for fighters—there were no photographs of these trends, but they existed. The strain imposed on Germany by a round-the-clock bombing, the opportunity to whittle down the Luftwaffe in combat, the economy of effort inherent in precision bombing—all these points and others were presented by General Eaker, CG of the 8th Air Force, and hammered home in a long statement to the Combined Chiefs of Staff at Casablanca.

Hindsight shows that the General might have summed up his argument simply by saying, "Gentlemen, at this stage in the development of night bombing, the destruction of the German Air Force cannot be accomplished by such means. Night bombing will not give us the accuracy necessary to destroy aircraft factories on the ground, nor the opportunity to decimate the Luftwaffe in the air. The only weapon in our arsenal capable of such a task is the American daylight heavy bomber. Unless we use it, and use it soon, the Luftwaffe will be so powerful that a land invasion of the Continent will become an utter impossibility, and even our air invasion will fail."

The Chiefs of Staff decreed that daylight bombing should continue. They ordered a Combined Bomber Offensive whose mission was "the progressive destruction and dislocation of the German military, industrial and economic system and the undermining of the morale of the German people to the point where their capacity for armed resistance is fatally weakened."

That gave the green light to the architects of destruction from high altitude. Ahead of them lay the critical year of 1943. It was clear, even at Casablanca, that the year was to see the most ferocious air fighting in history. The airmen, with other Allied commanders, hoped for a clearcut decision by the end of 1943. The hope for it was well founded but they did not get it.

The reason they did not get it was that the GAF still stood between them and their dream of unrestricted bombing of German industry. The Luftwaffe had lost much of its offensive strength, but its fighter production curve was rising steadily and Germany still had faith in it. The world had seen in the Battle of Britain what a determined fighter force could do in defending the homeland even when badly outnumbered.

A year before, soon after America's entry into the war, Goering had demanded—and received—top priority for the production of fighters. Plans called for production, by December 1944, of 3,000 aircraft per month as compared with the average of some 1,200 in 1942. Single-engined fighters alone were to be quadrupled. The reorganization was planned along mass production lines, with the use of slave labor to overcome manpower shortage as part of the program. The Germans took the precaution of locating most of their new factories at a respectful distance from the airfields of Britain. They did not think it necessary, at that time, to go in heavily for dispersal or to place their key production centers underground. Nor, apparently, did they reckon with the possibility of air attack from the south on such centers as Regensburg or Wiener Neustad.

The result of these miscalculations was a set of industrial complexes ingeniously contrived so that interchangeable units could facilitate repair of any damage to the whole system. It was, at the same time, a concentrated and vulnerable target for any air force that refused to be deterred by distance or aerial opposition. The Germans knew this perfectly well. They had in their possession enough crippled Fortresses and Liberators to know that the same aircraft which could strike their sub-pens on the fringes of Europe had sufficient range to reach the farthest corner of the Reich. But they never dreamed that one day Allied fighters would go all the way with the bombers, and they counted on their own fighter screen to protect the sources of their air strength. Perhaps they even hoped that we would make the effort, and fail, and abandon in despair all plans for the subsequent invasion of Europe.

In any case, in early 1943 the 8th Air Force, with no more than six groups and able to put no more than 100 aircraft over a target, must not have seemed too formidable an antagonist. The Stalingrad disaster and the African situation, where mounting Allied air strength was slowly strangling Rommel, must have caused the German high command more sleepless nights than a certain group of experts working patiently in Britain. But these Operations Analysts were determining, with a cold scientific logic from which the human element was weirdly excluded, which targets represented the Achilles heel of military Germany.

By April they were ready with their answer. The Nazi war effort was based on six major industries producing submarines, aircraft, ball bearings, oil, rubber and military transport. Each industry was vulnerable, to some degree, to high altitude precision attack. Poring over bomb plots and damage assessments from previous 8th Air Force attacks, the experts calculated how many heavy bombers were required to do the job. They weighed the factors of weather, of enemy opposition; they took into account the problems of target recognition, of German ingenuity at camouflage, of such protective devices as smokescreens. Like laboratory

technicians they arrived at a formula calling for certain numbers of planes flying certain numbers of missions. They submitted the plan to the Combined Chiefs of Staff. Give us these tools, they said, and we think we can do the job.

The plan was approved; indeed the first phase had already begun with an attack, on April 17, on the Focke Wulf factory in Bremen. But the loss of 16 heavies in this attack—the heaviest to date—was a warning that the Germans were not going to let our plan succeed without a bitter and protracted struggle. Such losses had been expected; the replacement rate had been fixed by the master plan to take care of them. But during 1943 anticipated replacements sometimes did not arrive as originally scheduled, and throughout the best weather months of that year, the 8th was several hundred planes behind the figure estimated as necessary to do the job. Since the number of German fighters opposing them was steadily mounting, the ferocity of the air battles increased, without decisive effect.

Before tracing the course of the air fighting over Germany in those critical summer months of 1943, it might be well to glance at what was happening in the Mediterranean. There the war was going well. Airpower was slashing at Rommel's over-extended supply line, blocking roads, strafing motor columns, sinking ships, shooting down air transports. Much of the doctrine of tactical airpower was being reasserted in action: that to operate effectively in conjunction with the ground forces, you first must have control of the air, that when you do have such control, the primary role of tactical airpower consists in attacking supply lines in the rear rather than close support in the immediate battle area. New lessons were learned every day about the value of softening up the enemy air force by bombing airdromes before launching a ground attack, about the importance of hand-in-glove coordination between air and ground commanders, about the necessity for integrated air forces that could act as a whole rather than scattered squadrons operationally tied to a particular army or navy unit.

This principle of unity of command was accepted at Casablanca in January 1943. In the following month, the converging 12th and Desert Air Forces were merged in the Northwest African Air Forces under General Spaatz, with a second air command in the Eastern Mediterranean, under Air Marshall Tedder. It was not until the end of the year that the solution of the joint command problem found clearest expression in the creation of the Mediterranean Allied Air Forces, in which the function of air units, not their nationality, determined where they were placed and how employed.

As the days lengthened and spring arrived, General Spaatz's forces proeeeded with the arduous and necessary task of whittling down the Luftwaffe. A constant problem in those early days was how to find enough fighters to protect the bombers against the still threatening Axis airpower. The original heavy bomber group, the 97th, found revenge for the pasting it had taken from the GAF on its first night in Algiers by plastering Axis shipping and harbor facilities. In December, it had been joined by three squadrons of Liberators from the 92nd Group in England, who lived in the desert on spam and dehydrated cabbage, harrassed Rommel's rear guards, and struck across the Mediterranean at Naples and the Sicilian airdromes. Several groups of mediums, living under conditions just as rugged, gave the Nazis a foretaste of what B-25s and B-26s could do. There were some bad moments in the Tunisian campaign—as, for example, when Rommel flung his panzers through Kasserine Pass. On that occasion everything with wings was thrown against him—even the heavies flying below medium altitude. But there were also red-letter days like the famous Palm Sunday engagement when P-40s of the 57th Group caught a swarm of JU-52s and ME-323s flying men and supplies to Rommel's hard-pressed forces and shot 79 into the sea in a slaughter reminiscent of the Battle of Britain.

In the MTO there was more variety of air combat—if not more heroism—than was dreamed of in northern Europe at that time. High, medium and low-level bombing, bridge-busting, strafing of armored columns and airdromes, skip bombing of Axis shipping—all these tactics and many others appeared in the 191 days between the landings in North Africa and the collapse of Axis forces there.

The kindergarten days of the 'Focus Cats', eyes of the Army

It was in this period, too, that an aerial weapon whose potentialities had never been fully exploited began to be reeognized as the indispensable aid to modern warfare. In 1939 one of Germany's best generals, Werner Von Fritsch, had predicted that the side with the best aerial photo-reconnaissance would win the war. In Britain the RAF had skilled photo-interpreters assessing bomb damage and making target selections based on high altitude photos brought back by unarmed Spitfires or Mosquitoes. A squadron of American Lightnings, profiting by RAF experience, was almost operational. But it was in Africa that tactical reconnaissanee proved itself invaluable to the ground forces. At one point during the final stages of the drive on Tunis, when weather grounded the recce boys, the ground commander flatly refused to move until his air photo coverage was obtained. Flying P-38s (F-versions) members of the 90th Photo Recon Wing experimented with night photography, and brought low-level photo-recon missions—dicing missions, as they were called—to a state of development which was invaluable later on in Italy and still later in the battles of France and Germany. They got little recognition for their work—photo recon was strictly hush-hush in those days—but they came to be acknowledged as the real eyes of the Army. To the long-range planners, with an eventual D-day in mind, their work proved beyond question that complete photo-coverage of the invasion area and its defenses would be indispensable to successful landings.

With the final collapse of the Axis African forces on May 18, 1943, airpower was free to turn its attention across the Mediterranean to what Mr. Churchill had once called the "soft underbelly" of the Axis. The Northwest African Air Forces was, by this time, a battle-hardened aggregation of nearly 4,000 aircraft, with 2,630 American airplanes, 1,076 British and 94 French. The first Axis target to feel the weight of its blows was Pantelleria. Between May 30 and June 11, this heavily fortified Italian island rocked under more than 6,000 tons of bombs and finally capitulated without a ground assault—the first territorial conquest to be achieved solely through airpower. It was a great victory, and a relatively cheap one—we lost 63 aircraft and claimed 236 of the enemy's while gaining fighter fields indispensable for the invasion of Sicily. It was a great victory, but airmen knew that such complete collapse of a garrison's morale was the exception rather than the rule. Had Pantelleria been defended by British and inhabited by Maltese, its fall might have been considerably delayed.

With Pantelleria fallen, plans moved forward rapidly for the invasion of Sicily. The primary mission of the Northwest African Air Forces was the destruction of the enemy airpower based there. Between July 1 and D-day, July 10, nearly 3,000 sorties were directed against airfields on the island and on the Italian mainland. The Luftwaffe took such a beating on the ground that it was able to offer only token resistance when the invasion finally took place.

All was not sweetness and light in the air, however, dur-

ing the invasion of Sicily. The airborne operations, in which American gliders made their first combat appearance, showed with clarity the need for complete coordination of land, sea and air forces.

Training for the airborne show had been complicated by the weather. Blistering 120-degree heat warped some of the CG4As and, just 10 days before the Sicilian D-day, a howling sirocco caused additional damage to the fragile craft. Nevertheless, preparations went forward.

The 51st Troop Carrier Wing, with 133 planes and gliders, was to carry British troops into action, the gliders to be released over the sea but close enough to the coast to make their landing zones. The 52nd Troop Carrier Wing, with 227 aircraft, was to drop American parachutists. Heavy preliminary bombing of the invasion area and strong fighter patrols were ordered.

In spite of such preparations, some things went wrong. Smoke from the bombing, rising to 5,000 feet, blinded both C-47 and glider pilots of the 51st Wing. Defensive flak was heavy. A strong head wind, plus other factors, resulted in 50 gliders landing in the drink. The 52nd Wing had little better luck. Some of their craft were shelled by our forces. Fires on the ground, reflecting on windshields, made visibility already obscured by smoke and dust even worse. Eight aircraft went down under fire from both friend and foe. Some chutists landed miles from their intended drop zones. Afterwards the mission was given an 80 percent efficiency rating, but this charitable reckoning must have taken into consideration the fact that the enemy was thoroughly confused by our own confusion and greatly overestimated the numbers of Allied aircraft involved.

The going continued to be rough for Troop Carrier throughout the remainder of the Sicilian campaign. Not so much from the Luftwaffe; our strikes against enemy airdromes kept air opposition light. But enemy flak was deadly. On July 11, we lost 23 aircraft out of 144. Two days later, a misguided Allied convoy sent up a barrage that knocked down seven more C-47s. Harrassed pilots began to shy at the sight of anything bigger than a rowboat.

It was a painful process of education, but the lessons were plain and not to be forgotten. They were: absolute necessity for complete coordination between all members of the triphibious team; need for distinctive markings to facilitate aircraft recognition; better radio navigational aids; planes less vulnerable to ground fire than C-47s; bigger drop zones for parachutists. Ruled out of the book were glider-releases over water, and the so-called "crash landings" of CG4As, which were too lightly built to stand the shock without injury to the occupants.

These lessons were applied to great advantage a year later in Normandy.

As the Axis grip on Sicily was slowly being broken, five groups of Liberators, three from the 8th Air Force and two from the 9th, staged what was probably the most spectacular single mission of the war—the August 1, 1943, strike against the Ploesti oil refineries. The decision to fly the 2,000-mile round-trip from Africa and go in at treetop level, gambling heavily on the element of surprise, was a bold one. It was based on the theory that the pinpoint accuracy obtained would justify high losses, that dodging radar detection would minimize losses by catching fighter and flak defenses unprepared.

Unfortunately, some faulty navigation nullified the element of complete surprise. The damage inflicted was considerable, but out of 177 Liberators, 42 were shot down or crashed, and 31 others failed to return to base. Ploesti was destined to be destroyed eventually by bombing, but to accomplish that destruction the heavies reverted to their fundamental tactic of high-level precision bombing. Not until almost a year after this first low altitude attack, when P-38s successfully dive-bombed the refineries through an effective smoke-screen, did American aircraft care to brave the flak defenses of Ploesti at low level.

After Sicily, inevitably, came Italy. Pre-D-day softening up of German airdromes, particularly a spectacular strafing of 200 JU-88s at Foggia, kept the Luftwaffe's head down. But the Wehrmacht was tough. At Salerno, the only suitable invasion point within range of our fighter cover, the Germans drove a counter attack to within a few hundred yards of the beach. Once again, as at Kasserine Pass, the heavies joined the mediums and the fighter bombers in an all-out effort to break up the attack and save the beachhead. On two successive days more than 1,000 sorties were flown, a commonplace later in the war, but a distinct achievement over a distant beachhead in September 1943. The morale lift given our ground troops was enormous.

OPERATIONAL TYPE AIRCRAFT PRODUCED BY GERMANY DEC. 1941 — MARCH 1945

PERIOD	JET & ROCKET	S.E.F.	T.E.F.	BOMB	OTHERS	TOTAL
DEC. 1941		360	130	510	150	1,150
1942		5,070	1,505	6,615	1,865	15,055
1943		7,440	2,555	6,155	1,340	17,490
1944	700	12,165	3,170	3,000	630	19,665
JAN.-MAR. 1945	670	2,975	530	20	120	4,315
					GRAND TOTAL	57,675

Movement of the 15th Air Force to Italy in the autumn of 1943 was a triumph of logistics. The main objective was to lose as little operational time as possible. Existing airfields in the Foggia area had been badly battered. These were repaired and others were carved out of the soggy Italian plain. The engineering problems involved were enormous. Steel mats were essential to keep bombers from bogging down in the spongy turf. Roads had to be built. Distribution of supplies inside Italy was a major headache. Most shipments were landed at Naples where shattered port facilities were restored with brilliant efficiency by Army engineers. This equipment then had to be transported over the spiny backbone peninsula to eastern airbases. Sometimes the task of moving several hundred tons of steel mat from one side of a marshalling yard to another was more of a problem than getting the same shipment across mountains.

Fortunately, warfare in Africa had taught everyone, including the AAF, much about the difficult art of keeping mobile. Combat crews never once lacked material with which to fight. Bomb stockage was kept ahead of requirements. Gasoline was piped in and stored in adequate field facilities. By the end of December, supply problems were largely licked. With its strength building up rapidly, the 15th stood ready for the critical responsibilities of the new year.

In England, the 8th was ready, too. Behind it lay a year of air fighting of unparalleled ferocity, a year of hope and triumph—and some bitter disappointment.

The year had begun with the first tentative strikes against the north German coast. Costly experiments with medium-level bombing had proved conclusively that Nazi flak was too deadly for any but high-level operations. And bombing accuracy gradually improved. The attacks on Kiel and Vegesack silenced most of the critics of daylight operations.

In the spring of 1943, however, the cardinal principle of concentration of our air effort was not fully realized. We made some successful strikes against rubber factories at Huls and Hanover, but were unable to repeat them, and the effect was not cumulative. German salvage was very efficient. Our failure to destroy the rubber industry was an example of biting off more than we could chew.

Besides, we were barely holding our own against the Luft-

waffe. By June, the Germans had more than doubled the fighters that opposed our first attacks, and had introduced a mortar-type rocket. It outranged our .50 caliber machine guns and its burst had a lethal radius of over 100 yards. It was fuzed to explode at 1,000 yards, and if the Germans had devised an adequate sight for it, they might well have driven us out of the sky before our long-range fighters appeared on the scene. Fortunately for us, Thunderbolts carrying 100-gallon belly tanks made their appearance in July. They were badly outnumbered, at first, and their range was still limited to the fringes of the Reich. But they slaughtered the twin-engine Nazi rocket-throwing fighters until the Germans were driven to their weird expedient of providing fighter cover for their own intercepters.

The flaming year of 1943: the mortal duel between the AAF and the Luftwaffe

The range of our fighters, especially when the Mustangs finally got into action, was the biggest surprise of the war to most of the Luftwaffe commanders. One prisoner, captured shortly after the Battle of the Bulge, told with evident satisfaetion how General Galland, the Nazi fighter eommander, refused to credit the reports of his own men until four Mustangs pouneed on him one day while he was observing an air battle in an ME-410, and chased him all the way to Berlin. He was convinced. So was the German high command. They knew then, as they admitted afterwards, that they had to develop their jet fighters—and soon. Nothing else would stop the daylight invaders.

All through that flaming year, weapon clashed with eounter-weapon. The Germans tried various forms of air-to-air bombing. None was successful. We trotted out the YB-40, a heavily armed Fortress designed to be a platform for firepower and nothing else. That was not a success; the added firepower did not compensate for loss of speed. With better luck, we introduced flak suits that reduced casualties appreciably. The Germans experimented with intruder Fortresses, with faked radio signals. We sent a squadron of B-17s to fly some night missions at very high altitude, while the RAF bombed the same target several thousand feet below. The reports were discouraging. Meanwhile, the RAF's superb air-sea rescue serviee reached the point where it eould and did drop whole motor launches to ditched airmen complete with everything exeept blondes.

RAF's Bomber Command, meantime, was locked in a night duel with the Luftwaffe as deadly as the day conflict. Beginning in March, 1943, with the 12-city blitz on the Ruhr, it poured a steadily inereasing tonnage on Germany. How much it hurt the Nazis could be judged by the skill and determination with which their night fighter force fought back. It was tough going, and the night bombers could not count—as the day bombers now could—on squadrons of friendly long-range fighters to come charging to the rescue. They had to rely on deception and raw courage. They had an abundanee of the latter, but the losses were cruel, and German eivilian morale showed no sign of eracking under the rain of fire from the night skies.

It is still too early to attempt finally to evaluate the relative merits of night and day bombing at their respective stages of development in 1943. When asked a question along such lines after the war, Goering shrugged his massive shoulders and said, "Well, we could always evacuate the cities!" But it must be remembered that the RAF's pathfinder technique had not reached the degree of perfection it attained later. And the use of radar promises to make some forms of night bombing virtually as accurate as day, before the seientists are through with it.

The shattering daylight battles of the last week of July, when the 8th made its first determined assault on the Nazi aircraft industry, left both sides close to exhaustion. It was at this point that the lack of reserves was felt most sharply by the AAF. By now it was evident that the growth of the Luftwaffe fighter force had to be stopped. With our heavy bomber squadrons weary and below strength, without long-range fighters for the last stages of deep penetration missions, the planners of the daylight offensive had to choose a target that would cause Germany the greatest possible dislocation. They ehose ball-bearings.

Concentrated in a few well-defended areas, the ball-bearing industry looked like the most promising Nazi industrial bottleneck in the late summer of 1943. Its dislocation would affect not only aircraft produetion, but transportation, guns, tanks and many other war products.

The attacks on the ball-bearing plants produced some of the fiercest air battles of the war. By September 1944, the Germans had lost the equivalent of five months pre-attack production. We have the testimony of the general manager of Junkers in Italy that "the attacks on the ball-bearing industry were an unqualified success and disorganized Germany's entire war production." Luftwaffe prisoners, too, complained of engine failures caused by inferior bearings. It is true, however, that Germany was cushioned against the blows to some extent by fairly large reserves and by the faet that demand for bearings dropped sharply as Allied airpower smashed factories and curtailed production. The eampaign against the ball-bearing industry hurt the Germans, but it was not deeisive in the sense that the later campaign against oil was decisive.

The two deadly air battles over Schweinfurt on August 17 and October 14 represented the climax of the air fighting in 1943. The second attaek, which eost us 59 heavies shot down over Europe, one in the Channel, and six that crashed trying to land, gave us proof that until we had adequate Mustang cover over remote targets, the cost was simply too high.

Yet if we were gloomy, the Germans were near despair. Goering issued an order in whieh he stated flatly that Luftwaffe's defensive efforts were inadequate. This was significant because the Germans had made frantic efforts to improve it. Steadily increasing attacks by our Britain-based Marauders on German fighter fields were driving the Luftwaffe farther and farther back toward the territorial borders of the Reich. During August, the Nazis had pulled the erack 3rd Fighter Wing out of Russia—at a time, too, when the German lines were sagging under the Soviet offensive between Kursk and Orel. They had converted night fighters to rocket-throwing fighter-bombers. They had set up elaborate refueling and rearming points from which their fighters could fly double sorties against the daylight invaders. They had issued orders, on pain of court-martial, that German fighter pilots were to go for the bombers and ignore the escort altogether. In a final desperate measure they had created the Sturmstaffel, a suicidal group of pilots who took an oath to ram the American heavies if all else failed. This Teutonic form of Kamikaze never came to much. But the fact that it had official sanction shows the German dread of our remorseless application of precision bombing.

With autumn came bad weather. Our formations had to fall back on instrument bombing, which at that point was far from a state of perfection. The Luftwaffe, licking its own wounds, rarely bothered to come up to oppose it. The climb through the icy overcast wasn't worth the risk involved. Slowly both sides built up strength for the final test whieh lay ahead. When USSTAF was created at the turn of the year, with the 8th almost at full strength and the 15th building up rapidly in its newly acquired Italian

bases, everyone knew the test was at hand. The decisive battles had not been fought in 1943. Perhaps 1944 would be a different story.

The year began with a furious assault on the German fighter factories. By now there was absolute clarity of purpose as to the first priority of daylight strategic bombing. It was the neutralization of the Luftwaffe. Without that imposed paralysis, the great machinery of invasion, for which the dynamic codeword *Overlord* had been coined, could not begin to turn.

By this time the German's monthly production of single-engine fighters had reached 650, with great expansion imminent. Breaking the back of this production would not only safeguard the invasion armada, it would leave our heavies free to attack the real Achilles heel of the Nazi war effort —oil. It might, moreover, liberate the RAF from the darkness that had been its chosen element for so long. Failure to neutralize the Luftwaffe simply meant that the war might be prolonged indefinitely.

The first round was fought on January 11, when some 800 heavies with escorting fighters attacked aircraft factories at Oschersleben, Brunswick, Halberstadt and elsewhere. The Luftwaffe offered furious resistance. Fifty-three bombers and five escorting fighters were lost. Our returning airmen claimed 292 Nazi fighters destroyed.

The decisive week did not come until late in February. Before that week, and indeed sporadically after it, the German Bomber Command showed a flickering spark of life. This took the form of the baby blitz on London, an effort in which an attacking force rarely exceeding 100 planes took heavy punishment to drop a few more bombs on the city that had survived the big blitz of 1940-41.

Just why the Germans chose thus to decimate their remaining night bomber squadrons, which might much better have been used against the juicy targets offered by the invasion, still remains a mystery. Perhaps it is not too far fetched to wonder if the German high command, watching the progress of certain secret construction along the French coast, came to the conclusion that their bombers were obsolete in view of what was coming and decided to give German home morale a boost at the cost of their remaining planes.

What was coming, of course, was the V-weapon assault on England. Since the summer of 1943, Allied intelligence had watched with growing concern Germany's experiments with the long-range rocket and the flying bomb. The RAF's surprise attack on the experimental station at Pennemunde on the Baltic was reported to have delayed the work by several months. But by the end of 1943, queer launching ramps were mushrooming along the coast, all ominously sighted toward London.

To the Maurauders of the 9th Bomber Command went the major responsibility for neutralizing this new threat. The targets became more and more difficult as the Germans modified and camouflaged their launching sites. Moreover, they were so heavily guarded by flak that exasperated AAF crews wondered audibly if the whole thing were not an elaborate Jerry flak trap. As the concern of high British officials became more acute, the heavies were also assigned to the targets. Their use was uneconomical—fighter bombing in the end was to prove the best antidote to the flying bomb sites—but the threat was too grave to ignore. The delay and confusion thus imposed on the Germans undoubtedly saved London from an ordeal far worse than eventually materialized.

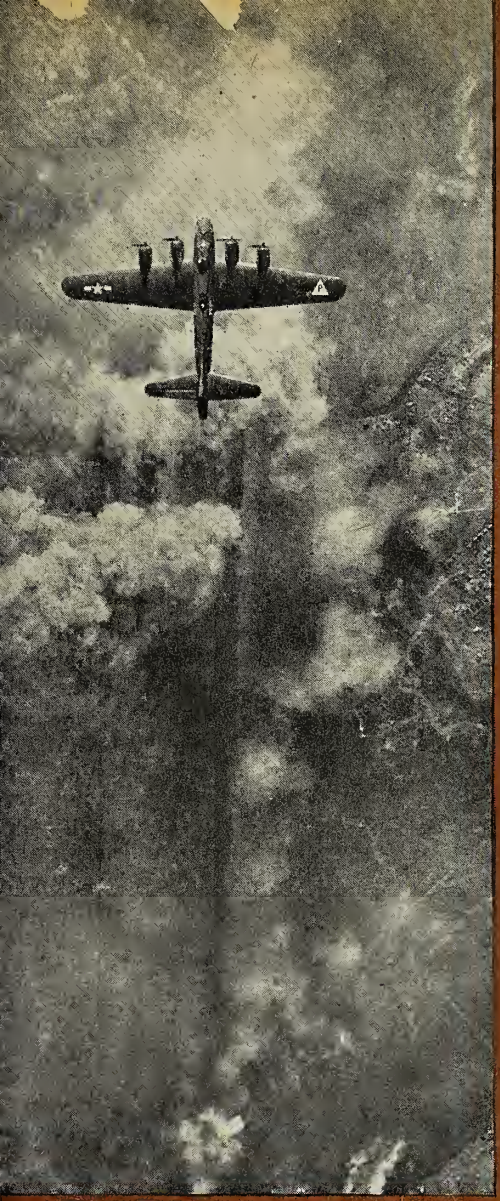
It is interesting to speculate as to what effect the V-weapon program had on the Luftwaffe. The diversion of materiel—and even more important—of the best scientific brains in the Reich undoubtedly weakened the GAF to some degree. The Nazis could hardly be blamed, for they knew they could never hope to match us in mass production of orthodox types. But if they had concentrated on their jet program instead of V-1, V-2 and other unpleasantnesses, they might have realized their dream of an aerial stalemate.

In any case, the V-weapon threat never interfered with Allied preparations for invasion. Neither did the Luftwaffe. That issue was settled in February with the almost miraculous week of good weather and the great two-pronged blitz from Britain and the Mediterranean on the Nazi fighter complexes. When the smoke of blitz week cleared away, German single-engine fighter production was reduced by 60 percent, twin-engine production was cut by 80 percent.

Dispersal was already underway, and with their amazing antlike persistence, the Nazis started doggedly to repair their factories. Constant policing of their production remained necessary, and grew more and more difficult as the industry disappeared underground. But the air losses they suffered during blitz week, both in planes and in pilots, made it impossible for them to come up regularly in strength if they wished to retain any sort of force in being against the certainty of D-day. In succeeding months, the Luftwaffe fought only to protect such vital targets as oil refineries, or the sacred heart of the Reich—Berlin. Even so, D-day found it tired and dispirited. The lifeblood had been drained out of it in February 1944.

In Italy, meanwhile, the MAAF had ably supported the Anzio landings, neutralizing German airfields in the vicinity, cutting supply routes to the battlefield. But the Germans were able to contain the beachhead and prevent the capture of Rome. Accordingly on March 15, an attempt was made to blast a hole in the main front across Italy at Cassino. This was the first mass use of AAF heavy bombers in close cooperation with ground troops. Four hundred and eighty-three planes dropped 1,205 tons of bombs on the town in a spectacular bombardment that caused worldwide comment. Cassino was pulverized but no break-through was achieved. The ground forces were unable to follow-up at once with a heavy infantry attack due to a few hours of waiting for bulldozers to clear a path for tanks through the cratered rubble. In the interval the stunned Germans were able to regroup and re-establish strong defenses. This lesson was not ignored when similar concentrated bombing was used at St. Lo, at the Rhine and before Cologne.

In the 12th Air Force's Operation *Strangle*, supply problems of the German armies in Central Italy were rendered so acute that when the Allies finally jumped off in the push for Rome, Kesselring was unable to hold them. By cutting all railroads, the mediums and fighter-bombers of the 12th forced the Germans to use motor transport. Then they pounced on these motor convoys and destroyed them. When the Nazis, in desperation, tried to send sup-



Flying Fort passes over smoking bearings plant in Berlin during March 1944 attack.

Troop Carrier C-47s drop men and supplies over southern France beachhead during invasion.

Rail bridge at La Frilliere, France, is completely wrecked after four successive aerial attacks.

Blasted German convoy gives eloquent proof of thoroughness with which tactical planes paved way for armies advancing across Rhine.

plies down by sea, Coastal Air Force sank their ships. It was a brilliantly conceived and executed operation.

As the days lengthened, preparations for *Overlord* quickened. Over Europe, long-range fighters divided their activities between their protective role and hunting for the GAF on the deck. Britain-based AAF mediums stepped up their attacks on airfields in France and Holland. The RAF withdrew from its grim battering of Berlin and turned its attention to French marshalling yards and enemy supply concentrations. Our photo-recon flyers mapped coastal defenses ceaselessly. Weather planes flew halfway across the Atlantic in rehearsal for the all-important day. The heavies, their mortal duel with the Luftwaffe almost ended, began girding themselves for the tactical commitments of D-day and a new strategic campaign—the campaign against oil.

The experiment with high altitude fighter-bombing

One interesting innovation that appeared in those expectant days was the brief experiment with high altitude fighter-bombing. A Lightning group, led by a modified "Droop Snoot" carrying a Norden bombsight and a bombardier, proved capable of dropping a respectable bombload with considerable accuracy and a minimum of risk. The implications of this type of bombing—with the bomb pattern easily controlled by formation flying, with relatively less danger from flak, with no escort required since the Lightnings could jettison their loads and defend themselves if attacked by enemy aircraft, with a risk element of only one man per ton of bombs instead of two men per ton as in a medium or heavy—the implications were interesting, to put it mildly. Granted that the Lightning was not so stable a bombing platform as a Marauder or a Fortress; granted, too, that the success or failure of the mission depended entirely on the skill of one bombardier—nevertheless this method of getting a bomb on a target seemed to have much to recommend it in terms of speed, safety and economy of men and machines.

The part played by airpower in the preparations for Overlord and in the operation itself cannot, obviously, be fully discussed here. A whole chapter, indeed a whole book, could be written about any one of a dozen major contributions: the RAF's last-minute neutralization of German radar which left the enemy groping blindly for the direction of our main thrust; the patience and skill that lay behind the work of the lone weather plane whose code message, flashed from far at sea, started the wheels of the whole gigantic machine; the superb effort of Troop Carrier in depositing two paratroop divisions behind the enemy lines and flying supplies to them despite fierce anti-aircraft opposition; the work of the fighters who struck at ground targets and guarded the seaborne armada; the instrument bombing of 1,077 AAF heavies who laid down a carpet of explosives 10 minutes before the landings, while the assault troops waited in their landing craft less than 1,000 yards from the beaches, the aviation engineers who built the landing strips under fire . . . the catalogue is endless.

The story of how tactical airpower cut the remaining bridges over the Seine before sundown on D plus 1, thus leaving the German defenders virtually cut off from reinforcements, has already been told in the pages of AIR FORCE and elsewhere. It was another *Strangle* operation, applied to an even more critical situation. There is no lack of evidence as to its effectiveness. General Guderian, Germany's great tank expert, growled afterwards: "Lack of German air superiority in Normandy led to complete breakdown of German net of communications. The GAF was unable to cope with Allied air superiority in the West."

Nevertheless, by the middle of July the Germans had managed to bring up enough reserves to contain our ground forces in an uncomfortably small space. The hedgerow war was falling farther and farther behind schedule when once again the heavies were called upon for a maximum effort. The British struck first at Caen, on July 18, and the Tommies made a five-mile advance. But the real breakthrough followed the American effort at St. Lo on July 25. Here 1,500 aircraft dropped 3,400 tons on the fixed positions of the enemy. The follow-up was instantaneous and decisive. The 1st Army, paced by the 9th Tactical Air Command, widened the breach and swung east. A week later General Patton's 3rd Army poured through the gap. The German counterattack at Avranches was smashed by a joint RAF-AAF effort. Tactical airpower was off on an offensive sweep that was to last until the end of the war.

With the breakthrough at St. Lo, the air war entered the exploitation stage. Limitations of space prevent here a full or even an adequate discussion of the colorful and varied achievements of the three Tactical Air Commands and the 1st Tactical Air Force in the pell-mell race across Europe. Some of their exploits were completely without precedent, as when the 19th TAC undertook to protect Patton's unguarded flank in his dash toward Germany, and did it so well that the German troops south of the Loire finally abandoned any thought of counterattack and surrendered in despair.

The farther the Germans retreated toward the homeland, the more they were harassed by swarms of fighter-bombers leapfrogging into airfields they had just abandoned. The degree of coordination between these tactical aircraft and the ground forces was far beyond anything the Nazis had achieved in their palmiest days of conquest. Tank commanders could whistle up fighter bombers in a matter of seconds. Roving aircraft controlled artillery fire, directing it on enemy emplacements and concentrations. Tactical reconnaissance planes kept an eye on enemy movements, spotting traffic jams that strafing Thunderbolts turned into traffic shambles. The losses of the Germans in vehicles of every kind had to be witnessed to be believed.

Meanwhile the Italian-based heavies, having shared the credit for the February victory over the Luftwaffe, were busy aiding the Russians by strikes against Balkan communications. This campaign to deny the Germans access to the Balkan battlefields continued right up to the fall of Vienna. At the same time MAAF was dropping supplies to partisans in Yugoslavia, flying shuttle missions to Russia, hammering Axis ports in Vichy France and occupied Greece, pounding the Brenner Pass through which material was flowing to the stubborn German armies in Italy, participating in the oil blitz, and preparing for the August 15 landing in Southern France, an operation in which our air mastery was so complete that only one German plane was on hand to oppose some 2,700 Allied sorties on D-day.

The oil campaign, which ranks along with the neutralization of the Luftwaffe and the immobilization of the Wehrmacht as the greatest contributions of airpower to victory in Europe, actually began a few weeks before the invasion of Normandy. To the British went the assignment of destroying synthetic oil plants in the Ruhr which were within easy range, even during the short summer nights. Oil targets in central, northern and eastern Germany, western Czechoslovakia and western Poland were given to the 8th; those in south and southeastern Germany, Austria, Hungary, Yugoslavia, Italy, Albania, southern Poland, southern France, and most important—Ploesti—went to the 15th.

This combined offensive continued in mounting strength through June and July. By the end of that month all but a handful of the important refineries and synthetic plants

had been attacked. Every intelligence source indicated at the time, and the Germans have since agreed unanimously, that the results substantially hastened the end of the war. Conservative estimates showed that the loss of output at the 66 separate plants attacked between May and July was in excess of 400,000,000 gallons. By August, gasoline production had been reduced to 20 percent of Germany's minimum requirements. By V-E day the oil industry was down to seven percent of pre-attack level.

This unqualified success, which left the remnants of the Luftwaffe with no gasoline for training pilots, left the panzers stranded for lack of fuel, and dislocated the submarine campaign more than bombing had ever done, was not achieved without cost. The Germans ringed their refineries with the thickest concentration of flak guns ever assembled. With plenty of guns and skilled crews, they took a high toll of our men and machines. The strikes against Ploesti alone cost the 15th well over 200 heavies.

The Nazis tried, too, to disperse their oil industry, but it was a slow process and they began it too late. Our timing of the oil blitz was good. If we had started it sooner, German dispersal would have begun sooner and might have gone far enough to provide the fuel for their jet program which was rapidly nearing completion when our ground forces moved in. If the underground jet fighter factory at Kahla with a monthly capacity of 1,000 ME-262s had been left unmolested for five or six more months, the consequences are not pleasant to contemplate. These heavily armed jet fighters were being seen in the sky by the end of 1944. They were neither sufficiently numerous nor, as a rule, sufficiently aggressive to constitute a major menace, but technically they were far ahead of any aircraft the Allies had in aetion for short-range interception and they are unquestionably the fighter planes of the future.

Accompanying the brilliance of the strategic performance against oil and the magnificent work of the TACs, there were a few disappointments in the latter half of 1944. Nonc was important in relation to the whole air effort, but in any attempt to present a balanced picture they are worth mentioning.

One was the partial failure of the Allied Airborne Army's first major effort to turn the northern end of the Siegfried Line. The retreat of the British from Arnhem emphasized the necessity for dropping airborne troops fairly close to the advancing ground forces, and highlighted some of the limitations of airborne supply.

Another source of some disappointment were eertain missions which were flown against the Germans who were clinging grimly to the Atlantic ports. They merely proved again that a motionless enemy, well dug into a fixed position, is hard to dislodge by air attack.

Then there were the much publicized shuttle flights to Russia. They did prove that the individual Soviet and American airmen had a lot in common and could get on well together. But any official exehange of information was somewhat limited.

On the other hand, Allied airpower performed superbly in the gravest threat against our march to the Rhine. This was in the Battle of the Bulge.

For the first four days of von Rundstedt's desperate counteroffensive—an offensive designed to buy a little more time at any cost—the weather was unflyable. On December 21, TAC Reconnaissance flew some suicidal sorties. On December 23, the weather mercifully cleared, and the TACs hurled themselves at the Nazi armored columns while in the next week the mediums and heavies dropped more than 100,000 tons of bombs in a gigantic interdiction effort. The Germans, obstructed in their narrow corridor by the heroie stand of ground forces at Bastogne and St. Vith, were unable to supply themselves under the ceaseless rain of bombs. By December 27 they began to pull out. Within a month, the bulge was hammered flat.

New Year's Day, however, saw the last offensive effort of the dying GAF. Goaded to desperation by Allied attacks on their airfields, the Luftwaffe commanders squandered their last reserves of fuel by flying some 800 sorties, most of them at low level, against Allied airdromes. They hit us a sharp crack—127 aircraft destroyed on the ground, 133 damaged. But the Nazis lost about 200 aircraft to flak and fighters, and they could not stand such losses. Some of their battered squadrons were returned to the Russian front in a vain effort to halt the final drive on Berlin. In the West the Luftwaffe was through. In March, when the great airborne assault across the Rhine took place—an effort involving some 14,000 troops carried in transports and gliders —not one of the carriers was lost to enemy air action.

There is no need to elaborate here on the final weeks that saw the airfields of the shrinking Reich jammed with aircraft which had neither fuel to fly nor place to go. In the first three weeks of April, our air forces destroyed more than 3,000 planes, most of them on the ground. This slaughter coincided with USSTAF's announcement that it had run out of strategic targets. Strange by-products of our bombing appeared, such as the bitter assertion of one prisoner that the Volksturm, the German civilian army, was nothing but an unemployment scheme made necessary by the destruction of German industry from the air.

By April, it was clear that Germany was conclusively beaten. The final capitulation in May was something of an anti-climax. Those who witnessed first hand the evidence of the terrible scourging Germany received from the air were not surprised by the total collapse of her war effort. The amazing thing was that any nation could have endured so much for so long.

Actually, the first postwar surveys seem to indicate that the German war machine was not fatally damaged by bombing—regardless of how the German people suffered—before July 1944. The reason for this was simply that up to that point German industry was keeping pace with the rising tempo of the bombing. German production in mid-summer 1944 was considerably higher than it was in mid-summer 1942, because in 1942 the Germans still hoped to win by a blitzkrieg type of warfare that did not require the harnessing of their full industrial strength. In July 1944, however, with the Luftwaffe knocked out of the fight, and selective bombing being applied ruthlessly by the Allies, the production curves of the Nazis went into a decline that led finally to oblivion. One of the main reasons was that our fighter-bombers began to paralyze rail traffic within the Reich itself. Coal trains leaving the Ruhr dropped to something like eight percent of normal. General Pelz, the Luftwaffe's fair-haired boy, was not exaggerating when he said, in the autumn of 1944, that unless the Allied fighter-bombers were driven away, there would be no coal for Germany's industries. Dispersal of industry to escape our strategic bombing made this transportation problem even more acute. But it is worth noting that until bombing of transportation facilities became heavy and sustained, the German railways were able to absorb terrifie punishment.

In the last analysis, the mission of Allied airpower was to hasten the collapse of the enemy. It achieved this mission partly by crippling his war production, partly by denying him mobility.

Exactly what percentage of German industry was destroyed by bombing is yet to be determined. The Nazis tried to hide the true facts even from one another. But the overall figure is not so significant; it was *selective* damage that counted. The 93 percent destruction of German oil produe-

tion was far more important in bringing Germany to her knees than the percentage of damage to her industries as a whole, whatever that figure may have been.

As for mobility, unless you can move freely, you cannot fight a successful war. When the Luftwaffe was slapped down and kept down, the Germans lost their mobility in the air. On D-day and thereafter the Nazi armies lost a fatal degree of their ground mobility to Allied air superiority which severed communications arteries and made daylight road movements virtually impossible.

Throughout the long years of war, as marshalling yards were torn up, railroad rolling stock destroyed, bridges knocked down and oil refineries smashed, German industry gradually lost the mobility that supplied it with raw materials and carried finished products to wherever they were needed. Lack of ability, for example, to transport V-weapons to their launching sites was one of the main reasons why this menace never became more effective.

		1942	1943	1944	1945
DELIVERIES TO AAF	BOMBERS	5,827	15,022	20,116	5,658
	FIGHTERS	5,213	11,766	18,291	5,842
GAF PRODUCTION	BOMBERS	6,615	6,155	3,000	20
	FIGHTERS	6,575	9,995	16,035	4,175

Such German local successes as there were toward the end of the war came only when the Nazis were solidly dug in and didn't have to move, as in some of the Channel ports, or when bad weather grounded the Anglo-American air arm, as it did temporarily in the Battle of the Bulge.

In postwar interrogations, prisoner after prisoner complained bitterly of being pinned down, of arriving too late, of not getting supplies on time. They could not fight offensively because they could not move. And they could not move because in a thousand ways Allied airpower had robbed them of their mobility. There, if you like enormous nutshells, is one to put the European war in.

The temptation to try to look into the future is irresistible, and such crystal-gazing is no idle occupation, because on it depends the supremacy of this nation in the air.

It is obvious that an air force such as we will possess on V-J day will be a tremendous factor in supporting and enforcing the principles and ideals of the United Nations Charter. Aerial photography directed by ourselves or our Allies can be useful in observing the activities of nations that are potential troublemakers, and the tremendous range of our very heavy bombers will enable them to remain a threat to any aggressor if global bases are maintained.

We must never discount, however, the possibility that in the future, despite our vigilance or perhaps through lack of it, new and revolutionary air weapons may be used against us. The flying bomb is still in the kindergarten stage of development. So is the radio-controlled rocket. The appearance of the jet fighter put the whole daylight bomber offensive in serious jeopardy. It is known that right up to the end of the war the Germans were working feverishly on improved flak defenses. If the range and accuracy of their antiaircraft fire had been much more deadly, our bombers would not have been able to stand the losses. And they had other unpleasant tricks up their sleeves.

In retrospect it seems that we were indeed fortunate in applying the overwhelming power of long-range bombardment just when we did. A few years earlier the bombers could not have carried decisive loads. A few years or even months later, improved defenses might have stopped them.

In the Pacific, we are now witnessing long-range strategic bombing brought to a magnificent climax. But the air defenses of Japan, even today, are not comparable to those of Germany in 1943 or 1944. We should not let such successes make us complacent or blind us to the ultimate vulnerability of the big planes to defenses now envisioned.

In any future war—and it is more realistic than pessimistic to face the possibility—the only certainty is that the weapons of the last war will be outmoded, and nothing becomes obsolete faster than an air weapon. Air fleets in being do not guarantee air superiority. Pre-eminence in research is just as important. To repeat a phrase from the beginning of this article, thinking—not materiel—is what wins wars. Boldness in discarding old weapons, ingenuity in devising new ones, and intelligent plans for using them are indispensable to national defense.

No one knows exactly what the laboratories of the future will bring forth in the way of new explosives, rocket projectiles, radar-guided flak, and so forth. At any time revolutionary weapons may revise all previous military concepts. The trend may be away from the super-airplane. Swarms of smaller, faster, more versatile planes capable of great range, considerable bomb-load, and a high degree of self protection, guided by radar, operating regardless of weather, by day or night, and augmented by various advanced types of V-weapons—this may be the shape of airpower in the future.

Whatever the future may hold, we would be foolhardy to rely on the protection of our surrounding oceans. To airpower already discernible, oceans will be no barrier. Nor can we be sure of finding, again, a natural airbase like Great Britain anchored to the flank of our deadliest adversary. We must maintain a force capable of instantaneous offensive action against any opponent anywhere at any time. The only power that can traverse land and sea overnight and put the enemy on the defensive is airpower.

AAF BOX SCORE OVER EUROPE

Cost of Strategic Bombing in Europe	$27,639,000,000
Total Sorties Flown	1,689,000
Sorties Flown on D-Day	9,984
Total Tons of Bombs Dropped	1,555,000
Total Men Who Flew Against Germany (Man Sorties)	7,235,562
Our Total Aircraft Losses	26,000 (18,000 on Combat Missions)

Much has been learned in three years over Europe about the stunning impact of bombing, especially when concentrated against two or three vital targets. But much has also been learned about countermeasures. Any aggressor nation, given the opportunity that Germany had before this war, will certainly disperse and conceal its key industries in such a manner that the power of strategic bombing to inflict fatal damage will be greatly lessened. The moral is too obvious to stress: the time to stop aggression is before the aggressor is ready to strike.

The time has passed—or should have passed—when people argue heatedly about whether or not airpower, unaided, can win wars. To date, it never has. This does not mean that it never will. But the question is almost academic in the face of two certainties that have emerged from the European war with the respective fates of Britain and Germany as final proof:

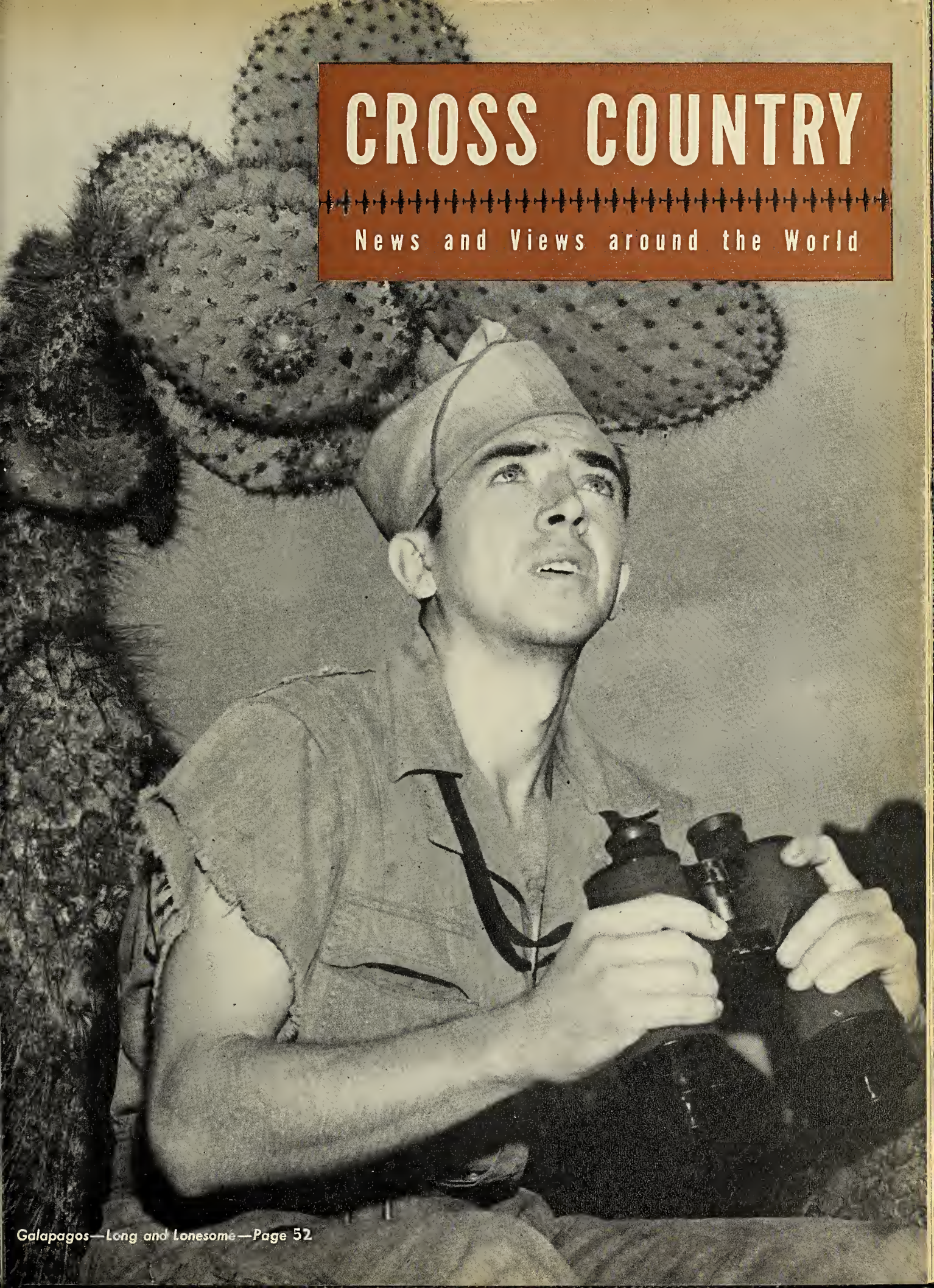
If you hold the air, you cannot be beaten.

If you lose the air, you cannot win.

We would do well, if we wish to dwell secure in this nation of ours, to remember those two lessons for the rest of our lives. ☆

CROSS COUNTRY

News and Views around the World



Galapagos—Long and Lonesome—Page 52

The Gang on Galapagos

The official history of the Galapagos Islands, located 805 miles southwest of Panama City and 505 miles west of Ecuador, tells of the fabled and beautiful Baroness Eloise de Bosquet Wagner Wehrborn who turned her back upon the social whirl of Vienna in the 1930s to sail away with two lovers and take up life upon one of these lonely rocks jutting out of the Pacific.

The Baroness arrived with great gusto and, so continues the official record, stripped down to panties and brassiere, and hung a pearl handled revolver around her small petal-smooth waist. She then rested a shapely limb upon a cleft of hardened lava and proclaimed herself Empress of the Galapagos.

Today a small group of AAF men, living on these desolate rocks, point with understanding to the passages of Galapagos history which reveal that within a few years the daring young adventuress went raving mad and began beating her lovers. Her little expedition mysteriously disappeared in 1934, island accounts show.

An Air Force correspondent, Capt. Joseph D. Guess, recently visited these islands and here are some of his observations: On the Galapagos Islands there are AAF aircraft warning stations which have kept a constant watch for enemy activity since the earliest days of the war, and they will remain on guard so long as there is the barest chance of enemy infiltration or sabotage in the Panama Canal area. These men operate the rim of defenses just as other air warning men keep watch in many more rock-bound and jungle-ridden spots of the Pacific. And for solitude, ruggedness and inaccessibility, these Galapagos stations are among the most forlorn of all.

These outpost sentinels have aided in locating many lost friendly aircraft, have guided bombers to submarine areas, have performed heroic rescues, but mostly their mission has been tedious months of listening, staring for hours on end into the sun, watching location instruments. It has been a long, weary, boresome, vital job.

"Sometimes at night," said Pfc. Cyril Bowers, 25 months in the Galapagos, "you see shooting stars and wish they were enemy flares. It gets so doggone lonesome out here as the months roll by, you begin to pray for some action to break the monotony."

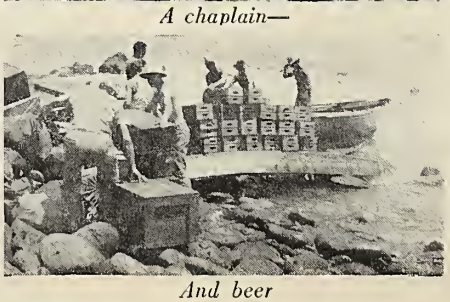
Yet, actually, dangers are always present. Although most of the 2,000 volcanoes, which belched forth billions of tons of lava to form these islands, are now inactive, a few of them still mutter and rumble—then go into action. Some months ago one of the watchers saw a large crater come to life without warning. It began to spout huge streams of lava, turning all it touched into fire and ashes. Part of the station area was overrun. The molten stream crawled across a pile of lumber, leaving nothing but a black dust. A radio call was made for help and an evacuation party arrived, but this was a season of constant enemy threat and it was vital for the station to be out of action as little as possible.

On the rocks. . . .

With goats—

Shots—

A chaplain—



And beer

M/Sgt. Adolph H. Wentz volunteered to stay alone and stand watch, then report by radio when the volcano had quieted down. Wentz set himself up on the beach and saw the rest of his party disappear by boat. The fiery eruption continued in force for 36 hours, then subsided. It was another nine days before the lava cooled down and the sergeant was rejoined by other station personnel.

But it is the degree of isolation, and nature's everyday animosity, which present the common hardships on these outposts. A nine-man crew is typical of the AW stations. They may be a hundred miles away from the Galapagos airbase. They have a barrack and an observation hut built high on a pile of rocks overlooking the ocean. On some of these islands of huge, ragged rocks are fissures through which a man might stumble and disappear forever. There are no places for landing strips anywhere near most of the stations. A plane drops mail once a week.

"The sack lands right at our hut door," said Cpl. Charles Catino, electronics expert, 25 months in the area. "The bomber boys are accurate, bless them. A few feet off, and we might never locate our mail."

The terrain is too difficult to clear off or level, even for a volley ball court, but the men have devised a number of rather bizarre off-duty activities.

"For a while," said T-5 Bernard Kennedy, 38 months in the 6th Air Force, "you get a kick out of catching sharks, or playing with seals. To catch a shark you drill a hole through a rock to hold the line. Then you bait a hook with a piece of bread and catch a small fish. Use the little fish to catch a bigger fish, then use the larger one to catch a shark. A good-sized tiger-shark stretches out eight feet, weighs 350 to 400 pounds and provides fresh meat for a week."

The seals probably come up from the Antarctic in the Humboldt current which rushes up along the west South American coast and turns out to the Galapagos to bring these islands, sitting directly beneath the equator, a bearable climate. Frequently a seal flops out of the ocean to rest beside a sprig of cactus, or cavort with an off-duty AW watcher.

Not all of nature's creatures on the rocks are so amiable, however. There are droves of ants and sand fleas, and foot-long centipedes and scorpions. Over the rocks roam packs of vicious dogs and herds of goats, the ancestors of which were left there by 17th century pirates. The wild dogs are silent, sure-footed beasts that live upon marine iguanas, strange, ugly, two-foot lizards. The goats make out a hardy existence by nibbling at cactus clumps.

Legends tell of uncountable loot buried in the Galapagos, but no AAF man has found even a piece of eight. As one of them has figured, it would take 300 bulldozers one year, or one bulldozer 300 years to turn over all the rocks on but one of the larger islands.

"About once every 20 days," explained Sgt. Frank Emry, one of the veterans, "we have a really great event. The supply boat comes with canned rations, some fresh meat, a little beer, books, newspapers, fresh water and maybe a portable movie, but most wonderful of all—new faces. Somebody new to look at!"

And among these new faces there regularly appears the grinning visage of S/Sgt. George Mohr. The sergeant pulls up to an island and unloads his paraphernalia amid hoots and howls of mock protest. "Doc" Mohr then takes out his needles and tells the men to "hold still and look the other way." Doc travels from rock to rock, remorselessly determined that each man will get shots and stimulators on the proper day.

Farewell and Hail

On her first trip westward since the war ended in Europe, the Queen Elizabeth carried 14,790 American troops out of Gourock, Scotland. Among them were 10,000 8th Air Force men, ground personnel of several bombardment groups which had attacked Germany for more than two years —the 91st, 351st, 398th, 401st, 457th, 482nd, and their air service groups.

Unlike the grim, expectant 8th Air Force men who landed overseas in May, 1942, wearing helmets, leggings and carrying carbines and packs, the returning men were clad in new-issue "Eisenhower" jackets and flightcaps, and carried only duffle bags and personal belongings. To many of the men, taken to Europe in Liberty ships, the Queen Elizabeth seemed like the Waldorf-Astoria afloat.

The actual loading of the big ship was a quiet and orderly affair, with most of the men deep in their own thoughts as they took their parting steps on British soil. A few of the soldiers, leaving British wives who will follow them to the States, seemed divided in their emotions. Lt. Wayne Roberg of the 401st Bomb Group, was sad at thought of leaving his bride of less than a month. "I've been sweating this boat ride for 27 months, but now that I've got to leave Betty behind, all the kick is gone."

Sgt. Floyd Broome of the Second Air Division expressed the thoughts of many another American when he said: "It's sort of like leaving your second home—like leaving a cousin to see your mother and dad."

The Airplane Commander

For the pilot who leads a flying crew, "The Airplane Commander," Air Forces Manual 65, is a martial 10 commandments. It contains abundant thought and study for the new plane commander as well as for the veteran of hazardous missions over flak zones of Europe and Asia.

Stressing the commander's importance and responsibilities, the manual contains a check list the flying chief can use on himself. This check covers points on piloting, bombardiering, navigating, engineering, gunnery and radio—points a commander should know to fulfill his duty

QUESTIONS

on Policy and Procedure

Q. Is a member of a combat crew (on flying status) wounded by enemy action when flying under competent orders entitled to draw flying pay while hospitalized for the wound? What is his pay status if captured by the enemy?

A. *Military personnel in flying status who are wounded by enemy action while in actual flight should be considered as having been incapacitated for flying by reason of an aviation accident. Therefore, they are entitled to flying pay for three months as provided in Executive Order 9195, 7 July 1942. It is the intent of pertinent existing regulations and directives that flying personnel will not receive flying pay while being excused from meeting flight requirements for a period in excess of three months for an incapacitating condition, the result of an "aviation accident." Where an individual incapacitated for flying by reason of an aviation accident has already qualified for aviation pay for the month in which he was injured, the 3-month period during which no flights are required does not begin until the first of the following month. If an individual is incapacitated for more than three months but is able to participate in the necessary flights prior to the expiration of six months from the date of injury, he may make up his flying time at any time prior to the expiration of the second three month period and thus draw flying pay for the second three months' period. If, however, the individual is incapacitated for a period in excess of six months, he receives flying pay only for the first three months' period of incapacitation.*

Any person in flying status and receiving flying pay who is officially reported as missing in action, interned in a neutral country, captured by an enemy, or beleaguered or besieged by enemy forces, will, while so absent, be entitled to receive flying pay as well as all other pay and allowance due him. No flying pay will accrue to his account after date of liberation unless required flights are performed or unless subsequent hospitalization is required as a result of flight injuries, in which event provisions of Executive Order 9195 (above) apply.

Q. Is it necessary to prepare extracts from Service Records (Sec XXXV, Par 78, TM 12-230) when enlisted men are merely being processed at a station?

A. *The Adjutant General advises that this is unnecessary, unless a material change occurs in their status while at that station.*

Q. Is a "summer battle jacket," made of light-weight materials, authorized?

A. *No. Such a garment is not an authorized item of the summer uniform, and there is no authority for the wearing of such an item by either officer or enlisted personnel (Sec VI, Cir 177, WD, 1945).*

Q. If an officer in the Air Corps Reserve on active duty is temporarily appointed to a higher grade in the Army of the United States does his time still count towards the $500 a year lump-sum payment for Air Corps Reserve Officers?

A. *Yes. Such an officer, though holding a higher temporary AUS commission, continues to serve as an Air Corps Reserve Officer, and may count service during such period in computing lump-sum payment (MS Comp. Gen. B-47363, 4 May 1945).*

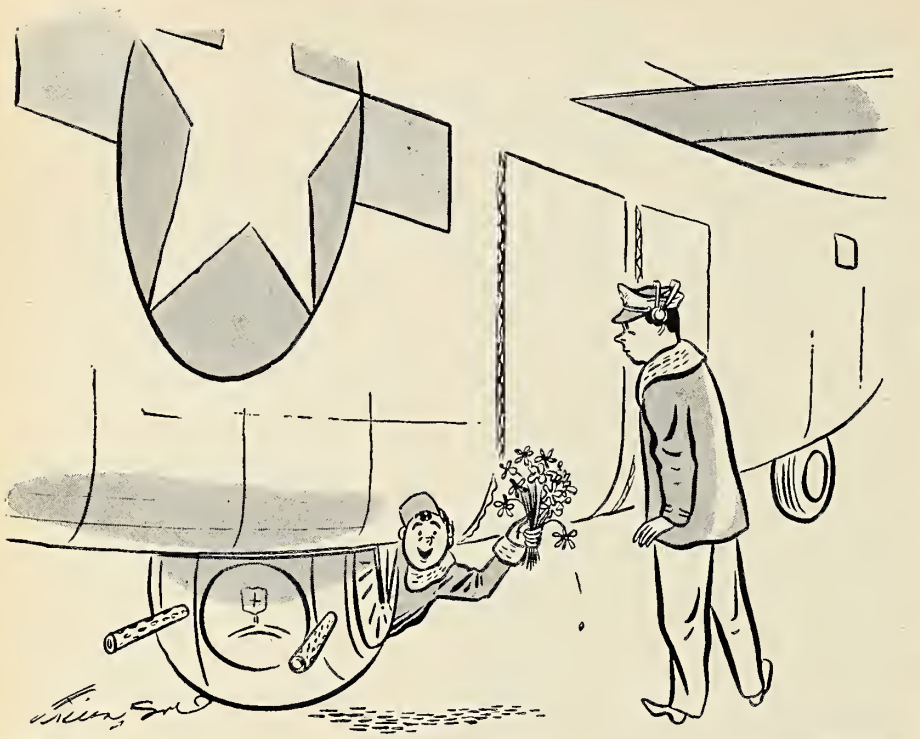
Q. Is the wearing of the discharge emblem on a uniform optional?

A. *Sec III, Cir 454, WD, 1944, states that this emblem "will be worn as a badge of honor indicative of honest and faithful service" by all military personnel (both officers and enlisted men) discharged or separated from the service under honorable conditions. Commanders concerned will insure that the honorable discharge emblem is affixed to the uniform of all qualified personnel during processing and prior to actual discharge or release from the service.*

Q. May mess equipment be issued to an officers' club on memorandum receipt?

A. *A temporary loan on memorandum receipt may be made to newly organized officers' messes pending purchase of similar equipment from mess funds. Reimbursement for breakage and loss will be made from mess funds. The sale of regular issue china, glassware, and silverware to officers' messes is prohibited by par 5, AR 30-2290.*

PREPARED BY THE OFFICE OF THE AIR INSPECTOR



WILKENSON AIR FORCE MAGAZINE

successfully and to gain the necessary respect and discipline of his men.

Manual No. 65 is published by Headquarters, Army Air Forces, AC/AS, Training, Training Aids Division, I Park Avenue, New York 16, N. Y. Distribution will be made to all pilots.

Information Files

Information Files now are available, or in the works, for five aircrew members—pilots, navigators, bombardiers, radio operators and radar observers (bombardment)—according to the Office of Flying Safety.

Here's the current status of the files and their revisions:

PIF—Revision 19 published in August.

NIF—Revision 3 published in July. Revision 4 due in October.

BIF—Revision 1 to be published in September. First copies of the book itself were distributed in May and June, 1945.

ROIF—Revision 3 to be published in September. New covers for ROIF are available at operations offices.

ROBIF—First edition available now to radar observers (bombardment) only. Revision 1 to be published in October.

Carpetbagging Libs

The strict secrecy which for a time covered activities of the 492nd bombardment group of the 8th Air Force has now been lifted, revealing the work done by these night-flying, black-painted B-24s based in England.

The group, located at Harrington just west of Kettering, had the mission of dropping hundreds of trained agents and sabotage men, and thousands of tons of military supplies including jeeps for resistance movements. Together with black Liberators of the 801st group, they made these night drops over France, Belgium and Holland. Flying from bases in Dijon, France, planes of the group later went deep into southern Germany, dropping agents in the mountainous national redoubt—men who observed enemy movements in that area and reported back to London by radio.

Liberators of the group flew with the RAF on 21 high altitude, night bombing attacks on targets in Germany. The C-47 Dakotas of the 492nd, flying at night, landed at secret fields in German-held France to bring in supplies and fly underground workers back to England for instructions and sabotage training. In the closing months of the European war, the group continued to fly agents and supplies from England, dropping them at night in Denmark and Norway.

The 8th Air Force's first dropping of supplies to the underground was carried on from January to August, 1944, by the 801st bombardment group (Prov.) commanded by Col. Clifford J. Heflin, of Fresno, Calif. In August the work was taken over by the 492nd which also was commanded by Colonel Heflin.

Operations which required landings in France were extremely hazardous. The Maquis had prepared landing strips with flashlights used for improvised flare paths. The C-47s were loaded down with 906 gallons of gasoline for the 1,000-mile round trip. They were without armor or armament and flew at low altitude into the German night fighter belt.

The first such flight was made by Colonel Heflin after D-day when he took four passengers to France. On the return trip he took off in a driving rain his plane carrying two American airmen, a Canadian gunner, a British gunner, and RAF navigator, a British major who was an organizer among the Maquis, a young French girl and Frenchman who were to attend a sabotage school, and two Hindus who had been rescued from the Germans by the Maquis.

In the following weeks, planes of the group landed at 12 such air strips. At one time a C-47 nosed over while landing, but mechanics flew in from England and soon had the aircraft ready to return.

Operations involving the parachuting of men and supplies over pinpoint targets in the occupied countries were known by the code word "Carpetbagging." The black Liberators flew singly at very low altitude around flak areas and through fighter-defended zones, skirting the rims of tree-topped hills to glide into valleys where the drops were to be made.

From One POW to Another

Lt. Daniel N. Myers, an 8th Air Force P-51 pilot, fell into the North Sea and, after 12 hours, floated into a German-held Frisian island. Myers was taken to a German prisoner of war camp and there he met a British flyer with a personal experience story that topped his own by a mile.

The Britisher said he had been a flying cadet training in the United States. One day he was shot down off the coast of Florida by a German U-boat. He was taken aboard the submarine and eventually reached Germany and the POW camp.

Mission on Mindanao

A platoon of 13th Air Force radio technicians eluded Jap patrols, fought alongside Filipino guerrillas and successfully operated an aircraft warning station on Mindanao for five months before the island was invaded.

The platoon's adventure was reported recently at Jungle Air Force headquarters by its leader, 23-year-old Lt. Edward T. Pompea of New London, Conn.

Hand-picked from units all over the Southwest Pacific, 39 enlisted men and Lieutenant Pompea were taken by submarine to Mindanao in September, 1944, weeks before the Leyte landings. Their job was to establish a radio network which would warn American bases to the south of Japanese aircraft movements.

Guerrilla help was promised, but offsetting this was the danger of discovery by patrols from the large enemy garrison on Mindanao.

The first contacts with the Japs came soon after the radio equipment was put into operation, Lieutenant Pompea said. Enemy patrols were observed by Filipino guerrillas heading toward several outposts established by the radio technicians. Within a few hours the outposts were dismantled and set up in new sites.

"We kept moving and the Japs kept following," the young officer said. "They never caught up with us, but there were times when it looked bad."

The radio men had brought rations only for 30 days, but their mission stretched into months. The Filipinos contributed

food and some of the soldiers shot wild deer and pigs in the jungles.

The biggest thrill came a few weeks after they had established their radio service. One man, turning the dials, thought he heard an announcement from "Radio Leyte." The others crowded around. Soon over the wireless came a broadcast announcing that American authorities had established ceiling prices on food to prevent inflation on Leyte.

"We knew then the Philippines had been invaded," Pompea said. "We passed the news along to the Filipinos, and they celebrated. We did, too, with some Jap whiskey a guerrilla gave us."

The platoon's hazardous mission ended when American forces established a beachhead at Zamboanga in March and overran large areas of Mindanao.

The radio technicians reported their mission accomplished without a single casualty marring their five-month expedition to the Jap-held island, although several men were hospitalized for malaria and jungle illnesses.

Trigger Unhappy

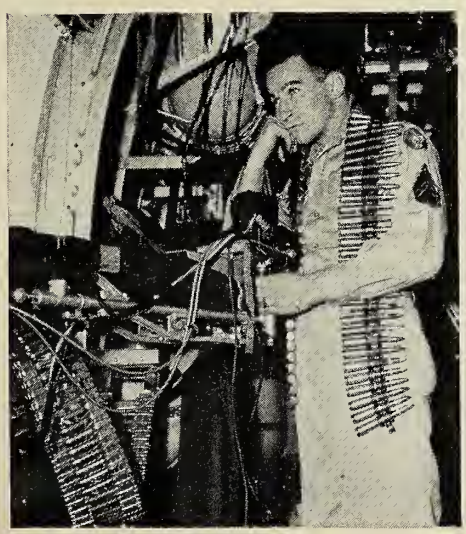
S/Sgt. Walter J. Szulborski of Bethlehem, Pa., is still trying to figure out whether he is the luckiest, or the unluckiest gunner in the entire Army Air Forces.

At the height of the aerial war against Germany, Sergeant Szulborski flew 50 missions against some of the hottest and most heavily defended targets in the European theater. He participated in the first two bombing raids on Berlin. He flew repeated missions against the Ploesti oil fields. He was on the first shuttle bombing raid from Italy to Russia.

Time after time, the vital and guarded industrial target of Brunswick felt the weight of bombs from his Fortress.

Yet, with more than 250 combat flying hours to his credit, Szulborski never fired a shot. This gunner had no opportunity to shoot at either enemy plane or objective.

As a matter of fact, no member of his crew—except a non-conformist ball turret gunner who got off a few desultory shots—ever had the opportunity to fire a gun



Not a chance

PLANE BONERS

Analyzed by Veteran Pilots

DALLAS, TEXAS—An A-26 pilot had to go around because of traffic congestion. Permission to make a short approach was granted as he came around the second time. When the final approach was made the pilot said landing gear green lights were on, hydraulic pressure was up, and horn was silent. Immediately after touching the runway the nose gear slowly collapsed.

Comment: Retraction tests demonstrated that warning lights and horn operated normally. When questioned, the pilot stated he had lowered gear at an airspeed of approximately 200 mph. This speed is too high to lower gear and, because of short approach, insufficient time was given the gear to lower and lock before touching the runway. Don't lower your gear until you have slowed down to the proper airspeed, in the A-26 about 160 mph is best. Allow enough time between lowering gear and landing to give hydraulic pressure time to effect locking of the gear.

BOISE, IDAHO—P-38 pilot leveled off for a landing with wheels not fully extended. On landing the right gear began to retract and the pilot retracted the gear to prevent the right wing from striking the ground first. The plane plowed off the runway with the main gear retracted.

Comment: Gear wasn't down and locked. If the pilot had followed a procedure such as the following he would have known it:

Watch the landing gear indicators (if installed) to see that wheels lower properly.

Make sure the pressure indicator gauge has returned to 1300 psi.

Test hand pump to make sure it resists operation.

Retard throttle momentarily to test warning horn (if installed) and light.

GREENWOOD, MISS.—A normal landing was made with a P-47, and after rolling about 500 yards the pilot retracted landing gear instead of raising flaps.

Comment: A split of the many millions tossed away by careless mistakes in airplanes would buy us all an evening to remember.

FAYETTEVILLE, ARK.—On a cross country flight a B-17 pilot asked an operations officer to call ahead and check an airport condition at Fayetteville. The operations officer did and was told by municipal airport manager that runways were in good condition. Pilot arrived at Fayetteville, attempted to land and skidded on the sod runway. He then pulled up for a go-around but hooked a fence with his tailwheel, pulling the plane to the ground where it struck some trees.

Comment: AAF Reg. 85-12 was violated in using a municipal airport not authorized for Army aircraft.

8TH AIR FORCE—Pilot in a P-51 started a loop at 12,000 feet. At the top of the loop the fighter fell out and went into an inverted spin. Pilot tried recovery but was unsuccessful and bailed out at 3,000 feet.

Comment: In looping the P-51 you have to fly the airplane over the top, maintaining sufficient speed to pull it through. The nose won't fall through by itself.

COLUMBUS, OHIO—A B-17 instructor ordered a student to operate manually the landing gear. Another student, acting as pilot, asked the instructor to run the before-landing check-list. The instructor, forgetting about other student cranking gear manually, put gear switch in down position.

Comment: Because the instructor wasn't capable of thinking about more than one thing at a time, the first student suffered a broken wrist when the landing gear motor went into action and tore the manual gear handle out of his hands.

PANAMA CITY, FLA.—Pilot stopped at a ramp intersection to allow gunnery instructors to climb out through the bomb bay of his B-24. One instructor climbed down and walked into the revolving No. 3 prop. He was badly injured.

Comment: Lucky man. Stop and look around before you walk away from airplanes. Then walk away only toward the tail, never toward propellers.

HOBBS, N. M.—After a night engine run-up, a B-17 student pilot held the plane with brakes while his instructor was checking Form 1A under the cockpit dome light. The student pilot unknowingly let brakes off and the plane rolled forward 150 feet without the pilot or instructor knowing it. It crashed into another B-17.

Comment: Do your paper work before starting the engines. Keep parking breaks set until ready to taxi unless the brakes are hot. Don't ruin your night vision by working under bright lights.

PREPARED BY THE OFFICE OF FLYING SAFETY

NEW BOOKS

WAR

OLD LEATHERFACE OF THE FLYING TIGERS: THE STORY OF GENERAL CHENNAULT. *Keith Ayling.* A biography of the organizer of the Flying Tigers and the 14th Air Force. BOBBS-MERRILL, INDIANAPOLIS, 1945.

SUPERFIGHTER—THE MUSTANG. *Air News (Periodical).* The production and combat record of the North American P-51 Mustang fighter. DUELL, SLOAN & PEARCE, N. Y., 1945.

WE FLEW WITHOUT GUNS. *J. G. Genovese.* The story of a pilot who flew with the RAF, the China National Airways, and finally as a test pilot. WINSTON, PHILADELPHIA, 1945.

MY RIVAL, THE SKY. *Margo Kurtz.* The wife of the pilot in "Queens Die Proudly" sweats it out at home. PUTNAM'S, N. Y., 1945.

I TOOK THE SKY ROAD. *N. M. Miller.* The exploits of Liberator Squadron VB-109 in the central Pacific by its commander. DODD, MEAD, N. Y., 1945.

HISTORICAL

PER ARDUA; THE RISE OF BRITISH AIRPOWER 1911-1939. *H. A. S. G. Saunders.* A history of the RAF. OXFORD UNIVERSITY PRESS, N. Y., 1945.

POSTWAR

TWENTY CAREERS OF TOMORROW. *Darrell Huff* and *F. M. N. Huff.* Suggestions for the men who will be making a vocational choice in the post-war years. WHITTLESEY HOUSE, N. Y., 1945.

TECHNICAL

ENGINEERING PREVIEW. *L. E. Grinter* and others. An organized course of study for students of engineering. MACMILLAN, N. Y., 1945.

PRACTICAL MARKSMANSHIP, THE TECHNIQUE OF FIELD FIRING. *M. M. Johnson.* An inventor and designer of automatic weapons tells how to secure maximum efficiency in field firing. MORROW, N. Y., 1945.

SCIENCE TODAY AND TOMORROW. *W. B. Kaempffert.* The progress made today in science with predictions of things to come. VIKING, N. Y., 1945. 2d ser.

THE NEW PLASTICS. *H. R. Simonds* and *M. H. Bigelow.* The advances made during the last five years by the plastics industry. VAN NOSTRAND, N. Y., 1945.

COASTS, WAVES AND WEATHER FOR NAVIGATORS. *J. Q. Stewart.* The physical environment in which navigation is carried on as well as technical information for the navigator. GINN, BOSTON, 1945.

These books are available to AAF personnel through the AAF Field Technical Library Service, which provides for technical libraries at all major installations. For a complete list of books so available, see TECHNICAL PUBLICATIONS FOR ARMY AIR FORCES TECHNICAL LIBRARIES. Book List No. 2. March 1945 and supplements thereto. These lists are compiled by AAF Headquarters Library.

Personal copies of these books may be obtained from the publishers or retail bookstores.

in combat during their entire 50 missions.

"The thing that bothers me most," Szulborski says, "is the fact that when I went overseas with my group in November, 1943, I was as well trained and qualified a gunner as any man in the AAF." The sergeant is now stationed at Langley Field, Va., and assigned to the AAF Training Command Radar school.

Brazilian Fighters

The War department recently paid tribute to the 1st Brazilian Fighter Squadron, which operated during the six months prior to V-E day under its own colors as an independent unit of Lt. Gen. John K. Cannon's Italy-based 12th U. S. Air Force.

The squadron, based near the Tarquina area in Italy, was under the command of Lt. Col. Nero Moura, former adviser to the Brazilian Air Ministry. Equipped with P-47s, the squadron was a component of the 350th Fighter Group, a part of the 22nd Tactical Air Command. The crews trained at Panama in March, 1944, and later at Suffolk Army Air Base, Long Island, New York. On October 6, 1944, the squadron arrived in the Mediterranean theater and the first day's operations, consisting of five sorties, took place on October 31.

Most of the unit's missions were dive bombing attacks but they also included armed reconnaissance, fighter sweeps, escort and weather reconnaissance work. Combat flying time per month averaged 32.1 hours per aircraft with squadrons and total flying time averaged 38.3 hours. The average monthly bomb tonnage per aircraft was 5.7 tons. The fighters dropped 991 tons chiefly upon German motor and rail transport, fuel dumps, gun positions, airfields and bridges.

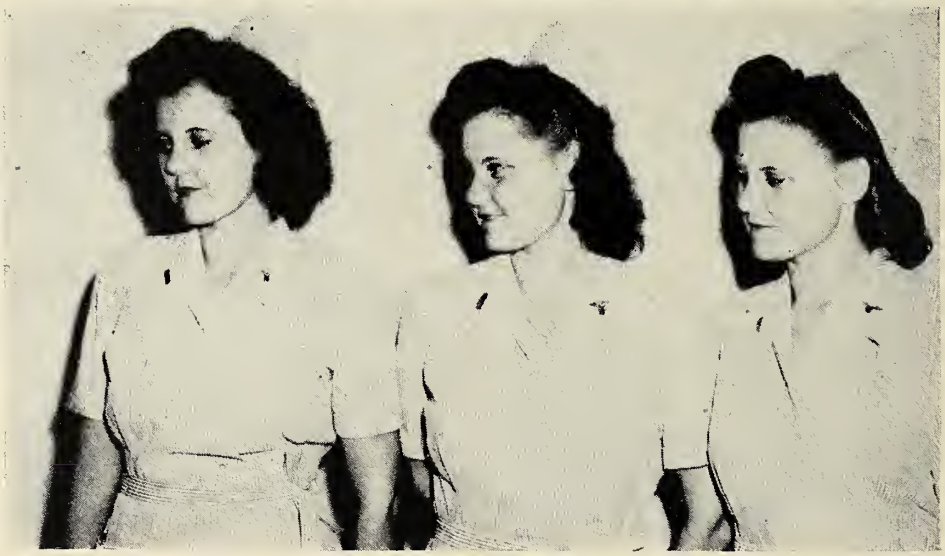
During these operations the squadron's loss was 0.8 percent per sortie. Nine of its pilots lost their lives. The squadron's planes consumed 1,109,728 gallons of gasoline.

The Brazilian airmen refer to themselves as "The Ostriches," a name derived from their emblem—a raging ostrich perched on a cloud, blasting away with an enormous revolver, and protected by the Shield of the Southern Cross, the national insignia of Brazil.

Triplet Promotion

The famed Chappelear triplets, Army nurses stationed at AAF Regional and Convalescent Hospital, Coral Gables, Fla., recently passed another milestone together. Left to right, Ellen, Elizabeth and Mary were promoted to first lieutenants by Lt. Col. Harriet M. Whitney, principal chief nurse.

Inseparable since birth, the Chappelears were graduated from high school in Hughesville, Md., in 1939. They took nurse training together at the Providence Hospital Division of the Catholic University School of Nursing in Washington, D. C., and were graduated in September, 1942. After a year on the staff of Providence Hospital, the sisters enlisted in the Army Nurse Corps in October, 1943, and were assigned to the Biltmore unit of the AAF Hospital at Coral Gables.



They went up together

Heads Up for Civilization!

The tip-off came when a pilot returned from a low-level mission on Luzon with his P-38 wearing a beard of telephone wires. It then became apparent that veterans of the 13th Air Force, newly arrived in the Philippines, were the airmen who needed re-education—not the hot pilots fresh from Uncle Sugar Able.

Stateside pilots, making their battle debut in the Pacific, have always been snowed under with advice, but this time it was the grizzled pilots from the primeval hunting grounds of the Solomons, New Guinea and Borneo, who needed some words of wisdom.

Capt. Jay H. Rose, 13th Fighter Command, says the transition from jungle to civilization was not an easy one. Many of the pilots, long away from buzzing restrictions and man-made obstacles, had forgotten that a civilized area adds dangers of its own to a strafing attack. Consequently, it became imperative to break the battle-

cocky pilots of their jungle habits, Captain Rose recalls. They had to be taught that these were unlike the days when a strafing pilot could roar down Rabaul's main street and raise hell with the Jap-sponsored geisha house.

There were taller houses, power lines, smoke stacks, factories, telephone poles—and heavier ack-ack to contend with.

Vegetables on the Half Shell

Ascension Island has 35 square miles of land, plenty of sunshine and a good climate, yet the AAF personnel stationed there could not raise so much as a dandelion on the island's bleak and barren surface.

Then, in January of this year, a party of eight enlisted men, an officer and a civilian landed at Ascension and blithely said they were there to grow fresh vegetables. The response was pathetic. "On this mess of lava and cinders?" the GIs asked. "Nothing has ever grown here. Nothing does. Nothing will." They settled back to their canned rations and watched the newcomers with a cool and jaundiced eye.

Then the island came to life. Four months later the visiting farmers were harvesting tomatoes, radishes, lettuce and cucumbers. Within a year the tomato plants will yield 40,000 pounds. There will be enough lettuce for 20,000 servings, and the radish beds have been estimated to produce 6,000 pounds every six weeks.

The explanation is hydroponics, the science of growing vegetables without soil. Hydroponics was introduced to the AAF at Regional Hospital, Coral Gables, Fla., after Col. Daniel Ogle realized that he had facilities for patients who were interested in carpentry, cabinet making and the like, but nothing for the ones who were farmers. It was not feasible to set up a small farm, and it wouldn't be easy for a man with an injured arm or amputated limb to plow a field. Consequently, chemical gardens were authorized. These proved successful, not only in providing recreation for the men, but also in supplying a large amount of fresh vegetables.

Through an inspector's report, this use of chemical gardening attracted the attention of several generals at AAF headquarters. About the same time General of the Army H. H. Arnold returned from a field inspection trip and gave the project his enthusiastic approval.

Synthetic gardening may be described in this way: A vegetable bed is made by digging first a number of long, thin trenches and pouring concrete into them. The inside is painted with a non-toxic asphalt to keep out certain poisons, and each section is approximately 100 feet long, 36 inches wide, and from 10 to 12 inches deep. Each bed is then filled with an inert media such as sand or gravel or, if necessary, a commercially prepared solution. A nutrient solution, containing the chemicals necessary for the growth of the plants, is passed through the beds by a series of pipes and valves. With that done, there is no further work but to wait and harvest the crops.

While the science of hydroponics is a relatively simple matter, it is necessary that the first work be completed by expert personnel. Eventually, however, the operation is turned over to base personnel who will receive instructions in the necessary technique. Teams of eight men will tour the world to establish the original gardens, and one or two team members will remain on a temporary basis until one complete cycle of harvest is completed.

Chemical gardens will not be established at installations where fresh vegetables can be grown. The synthetic process is not a competitor of ordinary means of farming and will be used only to provide vegetables at remote stations which ordinarily would not receive a sufficient supply.

In order to help select locations of future sites, certain information must be supplied. The office of the Air Quartermaster, in command of Brig. Gen. W. R. McReynolds, will want to know something about the normal amount of sunlight at the various installations, nature of the water supply, temperature range, the availability of gravel, construction materials, water tanks and similar pertinent facts. Maj. Ewing W. Elliot, chief of the Hydroponics Section, is now engaged in a survey to obtain much of this information.

Sown and grown in gravel

Panamanian Rescue

The 12th Emergency Rescue Boat Squadron, part of the 6th Air Force in Panama, recently rescued two men trapped beneath an overturned barge, an experience somewhat different from their usual task of picking up airmen in rafts, or from planes in the water.

This rescue was made by a squadron commanded by Maj. William A. Sears, when a Panamanian sand barge capsized in shallow water about 40 miles up the coast from Panama City. By tapping the heavy steel hull of the barge Major Sears was able to locate the two men who were trapped in a one-foot air space between the water and the bottom of the upside-down craft. The crew cleared off a thick coating of barnacles, then the major ordered everyone else back to a safe distance while he set to work with a cutting torch on the hull which contained gas lines and tanks for its Diesel engine. Within half an hour he had cut a hole large enough to release the first man. Another hole was cut to free the man trapped forward. The men, nearly suffocated, had been underneath the barge nine hours.

Engineer's Wings

The Superfortress engineer may now be identified by the wings he wears. Lt. Gen. Barton K. Yount's AAF Training Command has announced that henceforth all graduates of the command's flight engineering course will be awarded the new aviation badge, reproduced here. Instructors and re-

41- 6882D 42-206948C 42-738439A
42- 8135D 42-421698A 42-835263B
42-117582D 42-683163G 44- 2504F
S/N 42-79648E

Return to field indicated by letter after number as keyed below

A—Florence AAF, Florence, S. C.
B—Blackland AAF, Waco, Texas
C—Eglin Field, Fla.
D—Jackson AAB, Jackson, Miss.
E—Lockbourne AAB, Columbus 17, Ohio
F—Rosecrans Field, St. Joseph, Mo.
G—Hendricks Field, Sebring, Fla.

eent graduates now undergoing B-29 transition training are changing over to the new type of wings.

Heretofore, flight engineers have been awarded wings which bear the letter "O" in the center, to correspond with the aeronautical rating of Aircraft Observer. This rating and type of badge were shared with several other aerial specialists. The center of the new engineer's wings shows the outline of a Superfortress engine and four-bladed propeller.

Pacific Air Command

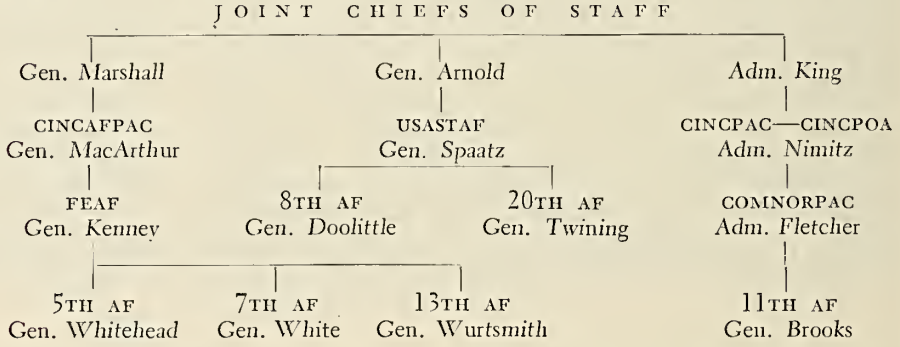
Army air command in the Pacific has been reorganized broadly along the tactical and strategic lines which proved so effective in the European theater. The tactical and strategic air forces, however, operate under an entirely different top command organization from that employed in the ETO.

General Carl Spaatz, our strategic air commander in Europe, has the comparable job in the final round against Japan, except in this instance his weapons are B-29s instead of Forts and Libs. General Spaatz operates directly under General of the Army H. H. Arnold, Commanding General of the AAF, and the Joint Chiefs of Staff. His deputy is Lt. Gen. Barney McK. Giles, and as the strategic components they have the 8th Air Force, headed by Lt. Gen. James H. Doolittle, and the 20th, under Lt. Gen. Nathan F. Twining, Maj. Gen. Curtis E. LeMay, former commanding general of the 21st Bomber Command, is chief of staff for USASTAF. The 8th's 29s will operate out of Okinawa while the Superforts of the 20th are continuing operations from the Marianas.

The tactical air assault is the job of General George C. Kenney and his Far East Air Forces, which now embrace the 7th as well as the 5th and 13th. General Kenney continues operationally as top air commander for General of the Army Douglas MacArthur, commander in chief of Army Forces in the Pacific. In addition to fighters, light, medium and heavy bombers, General Kenney's tactical operations also are employing B-32s in their first taste of combat. Commanders of the air forces under General Kenney are Lt. Gen. Ennis C. Whitehead, 5th; Brig. Gen. Thomas D. White, 7th; and Maj. Gen. Paul Wurtsmith, 13th.

Completing the AAF ring around the Jap homeland are the USAAF in the China Theater (10th and 14th), under the command of Lt. Gen. George E. Stratemeyer, and the Aleutians-based 11th Air Force, commanded by Maj. Gen. John B. Brooks and under operational control of the Navy's North Pacific commander.

ARMY AIR COMMAND IN PACIFIC



Dropped His Watch

Lt. James L. Bailey, a pilot stationed in the Hawaiian Islands, sauntered into his base legal office recently and said he wanted to file claim for a wrist watch. The lieutenant was asked what happened to his watch and he gave this explanation:

He was flying a Culver radio plane at 2,500 feet in the wing position of a practice formation. The formation was moving along quietly, when the first thing Bailey knew he was conducting a one-man flying circus.

Suddenly the lead plane dove out of sight and Bailey, instinctively, pushed the stick forward to follow the leader. Just as he did this, a squadron of P-47s loomed directly ahead.

By his quick move Bailey missed the Thunderbolts, but the strain of the dive loosened his safety belt and threw the upper part of his body out of the cockpit, leaving only his knees and feet inside. Stability of the light plane caused it to pull automatically out of the dive. Then, realizing that it might climb back into the path of the P-47s, Bailey pushed the stick again and the Culver went into a second dive.

This time Bailey was thrown completely out of the cockpit and on to the wing. But as he plunged out, instinct caused the pilot to grab for the side of the cowling and he managed to hold on until he could pull his knees under him and drag his body back to the side of the plane.

With all his remaining strength the pilot crawled back into the cockpit and pulled out of the dive, blacking out for a few seconds. It also took fancy flying on the part of some of the P-47s to miss the little plane's crazy antics.

Bailey's slight injuries included two cuts on the hand and a sprained finger The wrist watch was ripped off when he was tossed out on the wing.

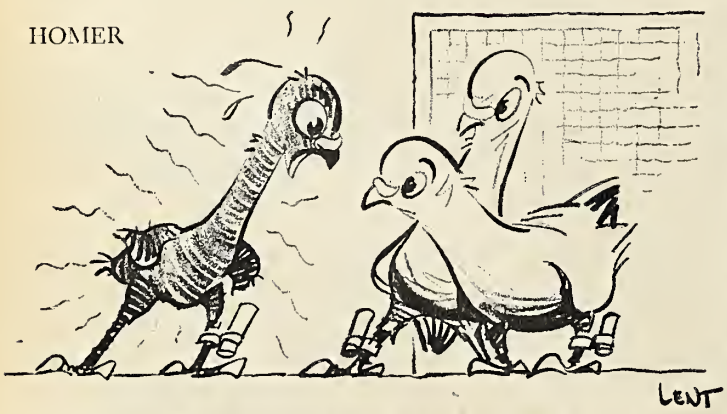
Award for Escape

S/Sgt. Lee C. Gordon, AAF ball turret gunner, was the first American to be awarded the Silver Star for escaping from a German prison camp and reaching Allied territory with valuable information.

Flying with the 8th Air Force's 305th bomb group, Gordon bailed out of his Flying Fortress when the plane was disabled by fighters and flak over Wilhelmshaven on February 26, 1943. He was captured and taken to a Frankfort prison camp for interrogation.

While being transferred to another camp late in March, Gordon and seven other prisoners escaped by jumping from the train, but were recaptured a few days later.

The sergeant escaped again on June 1 and rode through Germany on a bicycle for three days before he was picked up. He made his third and successful escape attempt from the prison camp at Moosburg on October 13, 1943, and reached the United Kingdom on February 27, 1944. ☆



"A group of jet fighters passed me at the same altitude."

The Private Air Force of Cpl. Weinberg

How a GI used the 8th Air Force to settle his personal score against the Nazis

BY LT. SAMUEL W. TAYLOR
Hq, USSTAF

ILLUSTRATED BY SGT. LOUIS S. GLANZMAN

When in November of 1938 the Gestapo threw a 16-year-old lad named Erwin Weinberg into a concentration camp they didn't dream of the retribution it would entail. He was but one of thousands taken in a roundup of Jews in Germany following the death of a member of the German legation in Paris named Von Rath, allegedly killed by a Jewish boy. The Nazis might well regret that because of the treatment he received, Erwin Weinberg went to America and eventually became a corporal in the U. S. Army Air Forces. Corporal Weinberg was never to fly a mission, drop a bomb, or shoot a gun at the enemy. Yet he was to enlist the enormous might of the 8th Air Force as a weapon for the settlement of his personal score. And now that his people won't suffer, the story of Corporal Weinberg and his private air force may be told.

He had a large account to settle. He and his father were arrested and flung into a boxcar crammed with other Jews. They knew their destination, Buchenwald, even in 1938 a name to be spoken in a whisper. At Weimar they were ordered out, faced against a wall, and then beaten over the heads from behind with rubber truncheons by SS troopers.

"This wasn't the extermination program," Erwin Weinberg says. "That didn't come until later. The Nazis merely wanted to discourage us and get us out of Germany. We were released if we could arrange to leave the country." Extermination or not, 500 Jews died the first month.

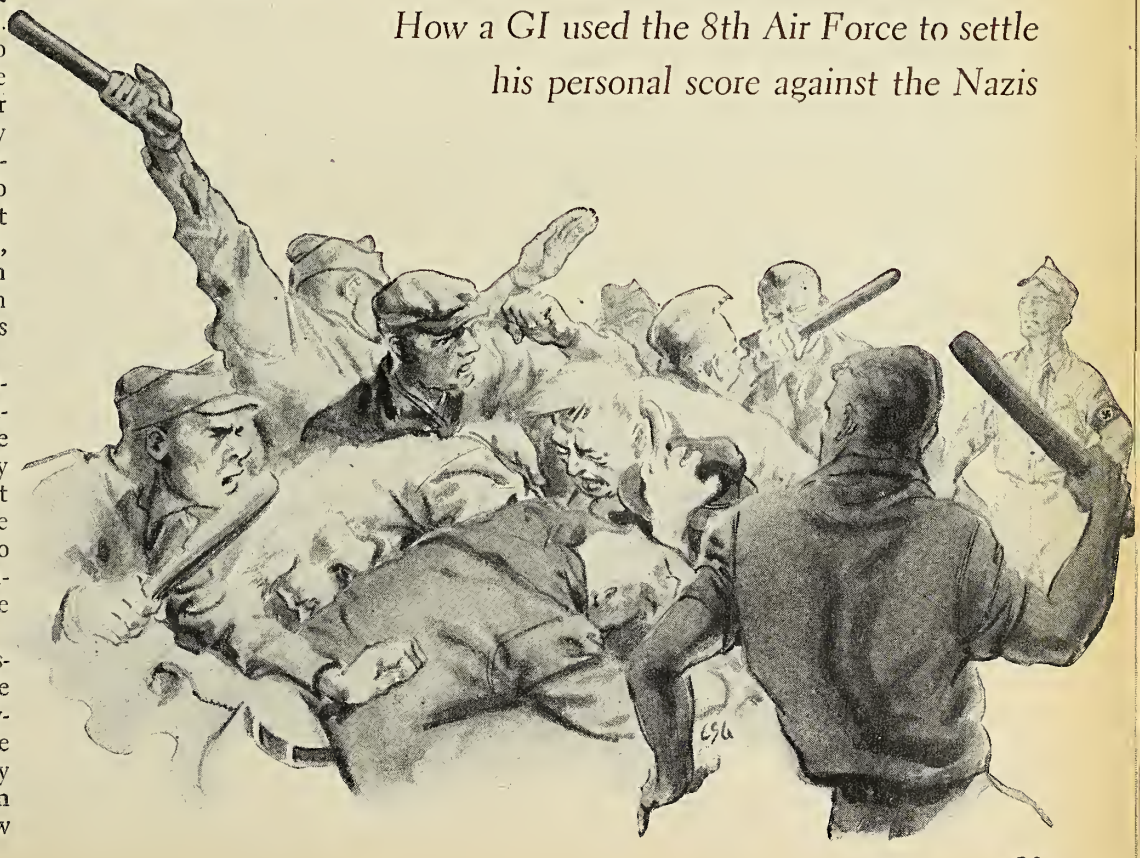
His mother secured permission to go to England. The Weinberg family had been trying to get to America since 1936, and their names finally reached the top of the list in 1940. Erwin arrived in the new land on a Tuesday, and went to work Friday morning in a Philadelphia factory making Army uniforms.

Young Erwin sewed U. S. Army uniforms and waited. The British began bombing Germany after the Blitz, and he got an idea of how to settle the score. But he was just one person, and he didn't know how to go about doing what he wanted to do. America entered the war, and he couldn't enlist because he was an alien. He wondered whom he could see, to tell his idea. It seemed impossible that anyone would listen to him.

But there is something about determination that makes the breaks. Finally in June, 1943, the Army accepted him, and for the air forces, where he needed to be. He became a U. S. citizen, which helped. The following February he landed in England, where he had to be. But still he was only a private, at the very bottom of the torturous Army channels. What could a private do?

He obtained permission of the first sergeant and spoke

(Continued on Page 72)



Mitchells of 38th Bomb Group in a May 17 attack drop bombs and propaganda leaflets on Suan-Tau alcohol plant west of Kaki.

Heavy explosions and black smoke cover Chickunan rail yards as B-25s score direct hits on rolling stock and installations in vicinity.

FORMOSA ... dud of the Far East

B-24s blast warehouses, rail lines leading into Takao harbor.

Bombs find mark in crowded factory district at Hoikow, Formosa.

Mitchell hit by flak during parabomb mission over alcohol plant.

Flak takes its toll as B-25 at left plunges to ground in flames.

Some of the finest bombing and strafing in the entire Southwest Pacific air war has blasted the once strategically important island of Formosa into a state of impotence. Mediums and heavies of the 5th Bomber Command, supplemented by bomb-carrying fighters of the 5th Fighter Command, have laid waste principal Formosan seaports, crippled airdrome facilities so completely that hardly a plane has been able to operate from the chain of airfields for months, severely damaged rail centers, hydro-electric plants, copper and aluminum refineries and the island's vital alcoholic industry from which Japan once drew a large percentage of ingredients for high octane aviation gasoline. With air and ground action moving steadily northward into the heart of the Japanese Empire, Formosa long since had ceased to be a major factor in the outcome of the war in the Far East. ☆

AAF QUIZ

Here is something new in AIR FORCE brain twisters. Beginning this month, every question in the AIR FORCE Quiz will be based on information contained in the preceding 12 issues. If you have been reading AIR FORCE carefully, this should be easy. See Page 79 for answers.

1. The Luftwaffe at the time of Germany's unconditional surrender in May, 1945, had been in existence
   A. *18 years* B. *4 and one-half years*
   C. *15 years* D. *10 years and 2 months*
2. British Air Commodore Frank Whittle has contributed significantly to the advancement of aviation by his work with
   A. *incendiary bombs*
   B. *area bombing*
   C. *radar* D. *jet propulsion engines*
3. The F-13A is a
   A. *Navy experimental fighter*
   B. *B-29 photographic plane*
   C. *Navy trainer*
   D. *AAF jet trainer*
4. From January 1, 1939, through March, 1945, the AAF Training Command graduated approximately how many pilots?
   A. *100,000* B. *225,000*
   C. *50,000* D. *750,000*
5. The latest type of launching device for rocket-firing fighters permits the P-51 to carry how many rocket projectiles?
   A. *6* B. *8* C. *10* D. *12*
6. The "Glip" (double-glide approach) technique of bombing has been used with best success against
   A. *bridges* B. *naval vessels*
   C. *parked enemy aircraft*
   D. *vehicular traffic*
7. The Air Transport Command in 1944 flew approximately
   A. *1,000,000 miles*
   B. *30,000,000 miles*
   C. *75,000,000 miles*
   D. *300,000,000 miles*
8. Generally considered to be the most maneuverable of all the present Jap fighter planes is the
   A. *Oscar Mark II* B. *Zeke 52*
   C. *Tony* D. *Nick*
9. How many cylinders are in the Wright Cyclone engine used on B-29s?
   A. *12* B. *16* C. *18* D. *24*
10. For a normal parachute landing, your arms should be
    A. *Folded across your chest*
    B. *Folded before your face*
    C. *Extended outward, with elbows slightly bent*
    D. *Raised upward, with hands grasping risers*
11. Compared to the number of moving parts in a conventional engine, the jet engine has about
    A. *5 percent as many*
    B. *10 percent*
    C. *25 percent* D. *50 percent*
12. The Davis wing is used on the
    A. *B-26* B. *B-24* C. *A-20* D. *B-17*
13. A B-29's wing loading is
    A. *40,000 lbs.* B. *64,000 lbs.*
    C. *120,000 lbs.* D. *144,000 lbs.*
14. Armament can best be concentrated in the nose of a fighter with wings of swept-back design
    A. *True* B. *False*
15. The average antiaircraft projectile gains altitude at a per-second rate of
    A. *250 feet* B. *1,000 feet*
    C. *2,500 feet* D. *3,250 feet*
16. The Army plane "Question Mark" made aviation history in 1929 by
    A. *Flying non-stop from New York to San Francisco*
    B. *Ferrying supplies to earthquake victims in Chile*
    C. *Winning the Schneider Cup speed race*
    D. *Staying airborne for six days*
17. Under Public Law 790, any shipment of gifts sent by military personnel stationed outside the U S. to persons in the U. S. is duty-free to the extent of
    A. *$25* B. *$50* C. *$100* D. *$10*
18. A compressibility shock wave on an aircraft wing was first photographed by
    A. *Maj. Frederick A. Borsodi*
    B. *Col. A. V. Laving*
    C. *Lt. Col. John Sparks*
    D. *Capt. George S. Petersen*
19. Women's Army Corps personnel on duty with the Army Air Forces as of May, 1945, totaled
    A. *75,000* B. *30,000*
    C. *150,000* D. *280,000*
20. Identify this airplane.

SKY FLIVVERS

(Continued from Page 32)

from war production. Cruising speed is about 116 mph, with a range of 580 miles.

Another company which has mass production machinery at work is Culver Aircraft Corporation, makers of the Culver Cadet, two-place pre-war low-wing, the fastest small plane on the market in 1930-1940. Once it was a front-wheel, tail-wheel airplane. Now it has tricycle gear. There will be a bigger, more powerful engine. Production methods like preforming of parts and spar jigs for maintaining perfect profile will cut down on the cost.

Although most companies, at some time or another, hope to go to all-metal construction, besides the Ercoupe there is only one metal plane on the "first available" list, Luscombe's "Silvaire," which has metal fusclage with fabric covered wings. Before the war "Silvaires" sold for about $1,985 and the price of the new model will be about the same. For that you'll get a high-wing design that looks like Lindbergh's famous "Spirit of St. Louis." Larger gas tanks will permit a range of about 500 miles.

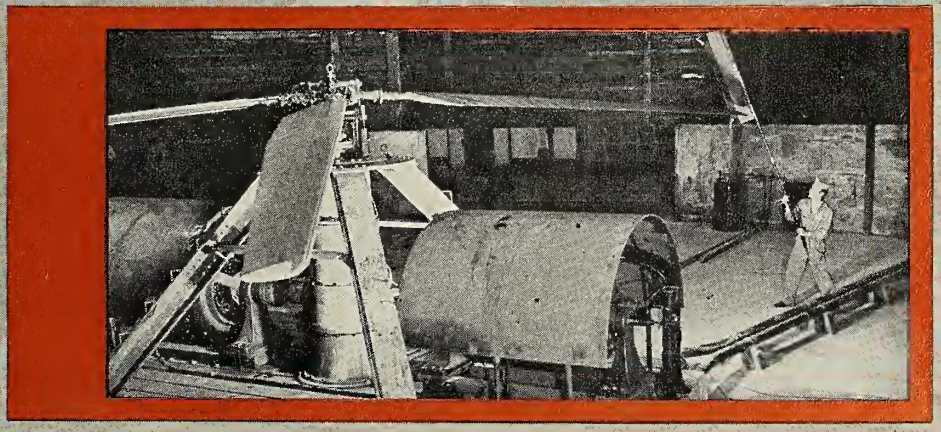
There are, of course, many other postwar planes. Embryo designers have created all types of aircraft, some faster, some bigger, some that introduce new flight principles like tail-first planes and rotating wings. There are airmobiles under consideration. Planes that have removable or folding wings and can be stored in the garage or driven along the highway like a car. Some concerns are engaged in building civilian helicopters. Higgins, Bell, Kaiser have rotating wing airplanes in the design and test stages. They look good, but our own engineers tell us that the practical helicopter is several years in the future. The whirligig machines in their present state cost too much. Too many "bugs" must be flitted out before they become practical for civilian use.

Some designers, with an eye to the future, are considering jet-propulsion for the light plane. One engineer has gone so far as to apply a jet engine to the Ercoupe with an "interesting" theoretical conception. The men I talked with, however, believe that jet stuff in small planes is a long way off. They point to such present disadvantages as expensive fuel consumption, complicated redesign, the dangers of using "hot" engines with fabric-covered planes.

The "Sky Flivvers" are here. But the day won't come, for a while anyway, when they will blacken the sky.—Douglas J. Ingells, AIR FORCE Staff. ☆

Styled as "America's First Light Airplane," this Aeronca was powered with 28 hp engine.

technique



Helicopter Rotor Test—Page 69

The latest, modified version of the P-80 demonstrates a great improvement over the Shooting Star's earlier models, both in appearance and in its combat performance. Three views reveal its clean aerodynamic lines, while picture at lower left shows a General Electric Company turbo-jet power plant.

The P-80A—New and Improved

Since its first flight in January, 1944, the jet-propelled Shooting Star has been struggling through the growing pains of technical development, and today's "A" model P-80 represents in full measure the fruit of engineering progress and research. Its nose has been extended more than two feet, the wing structure has been improved and the duct system has been changed. The gross weight of the plane has been increased by several thousand pounds, and with a special high-gloss wax polish, cruising speed of the craft has been jumped by 20 mph.

In appearance, the new fighter is one of the cleanest aerodynamically of any ever built, which is one of the reasons why it has shown exceptional characteristics in compressibility regions. Its ceiling and range are comparable to our latest conventional fighters, and an improved type of wing employs aerodynamic innovations that offer a superior rate of climb and angle of climb at high speeds. A hydraulic aileron boost and electrically operated flaps give the plane a superlative degree of maneuverability, while the bubble canopy, the location of the pressurized cockpit forward of the wing and the slender lines of the nose greatly improve pilot visibility for all acrobatics, including ground strafing at a speed that befuddles the compensating sights of antiaircraft guns.

The fuselage is of semi-monocoque construction, and all skin is flush-riveted to reduce surface drag. Wing span is 39 feet, length is 34½ feet, and height to the top of the rudder is 11 feet, 4 inches. Weight is about 8,000 pounds empty and close to 14,000 pounds when fully loaded with ammunition, photographic equipment, bombs and fuel. Droppable tanks may be carried under the wingtips.

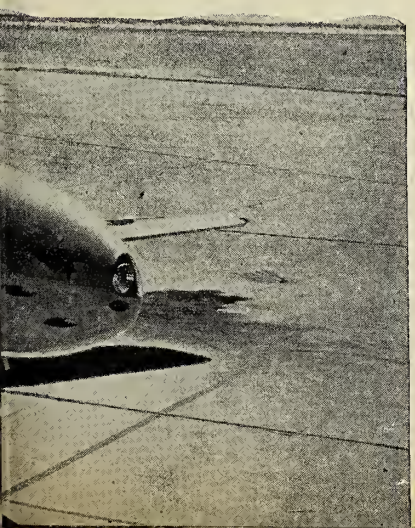
The power plant is an improved General Electric turbo-jet unit that takes air in through the fuselage ducts ahead of each wing and exhausts through the tail—in contrast to the G. E. I-16 twin-engine installation on the P-59, which exhausts from nacelles located on each side of the fuselage. Jet engines are rated by the number of pounds thrust they can produce at sea level in a static condition, and under specific conditions this power output can be translated into hp ratings by multiplying true airspeed by net thrust and dividing the result by 375.

The turbo-jet functions powerfully and smoothly, generating its energy so readily that the engine requires no warmup and prepares the Shooting Star for take-off in less than a minute. It uses much less fuel at high altitudes than it does going at the same speed at low and medium heights, and its only control is the throttle. It produces no

vibration, thus lessening pilot fatigue, and no noise is heard in the coekpit, since the rumbling roar of combustion passes out from behind. Moreover, the jet engine is far lighter than gasoline engines of comparable power and can be restarted in flight at any speed above 175 mph.

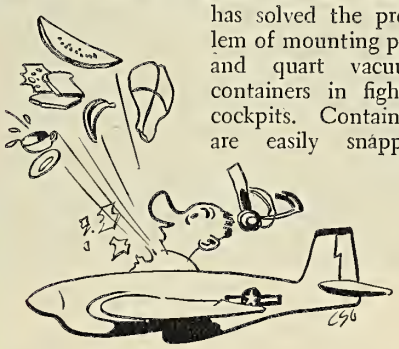
On its first test run the Shooting Star attained a true airspeed of over 500 mph, and is now on its way to surpass the 725-775 speed of sound. In subsequent trials, covering a period of more than a year and a half, many bugs have been chased out of the planc. A duct rumble that cut down efficiency and affected maneuverability has been eliminated by controlling the flow of boundary-layer air. Antennas that ereated large drag forces at high speeds have been replaced by internal antennas, and shell cases that battered the floor of the plane are now thrown into the airstream from an electrically operated ejection chute door that opens while the guns are firing. Another problem that presented itself was the fact that at high speeds and altitudes cockpit temperatures ran as high as 150 degrees F. and the controls were almost too hot to handle. To cool the pressurized air, a miniaturc turbine-compressor type refrigeration unit weighing only 18 pounds and operating from air compressed by the jet engine impeller is being perfected and already has successfully cooled the cockpit to 75 degrees F. at 20,000 feet.

Designers of the P-80A have tried to make their plane a mechanic's dream. To pull out an engine, only five tools are required, and the job can be done in 20 minutes. To take off the rudder or elevator, only one nut and a slide-cover have to be removed. And Lockheed engineers are still striving to further simplify the maintenance and repair work for ground personnel.



tech topics . . . about aircraft and equipment

Chocolate bars, sandwiches and hot coffee are the foods airmen like best to have with them on long missions, according to a recent survey among pilots and crew members. As a result a series of new rations to include more of these "delicacies" are being worked out. . . . A small bracket that works with claw-like aetion has solved the problem of mounting pint and quart vacuum containers in fighter cockpits. Containers are easily snapped



into the bracket and can be removed with the slightest pressure of one finger. . . . New galley kits for cargo planes and bombers also have been produced. Each unit is about two feet square and contains a grill, two hot cups and storage space for food supplies.

Special polaroid filters for a new camera lens eliminate glare and reflection during taking of over-water photographs. Also under test for drying photographic prints is a continuous-belt type of dryer made of fibreglass.

A small dolly simplifies ground handling of the AAF's "Flying Dutchman," air-sea rescue boat. A hydraulic lift on a carriage raises the boat into position for "bombing up" the "mother" airplane. It permits attaching the boat in about half the normal time previously required. . . . Another small wheeled dolly is being built to haul a light-weight engine starter for jet-propelled aircraft. The dolly is also transportable by air.

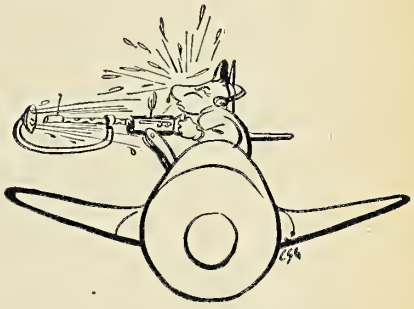
The Link Instrument Flying and Landing Trainer has been equipped with an automatic pilot to acquaint personnel with the principles, appearanee, operation, adjustment and maintenance of auto pilots. The device, mounted in the Trainer has cutaway parts encased in clear plastic to show how the robot functions.

Latest full-feathering propeller is a combination design. It has a hydromatic hub shell and electrically-operated blades. The principles of the Hamilton Standard Propeller and Curtiss Electric Propeller were eombined to get this unorthodox operation.

Because sometimes day fighters take off in the dark hours just before dawn and return when darkness is setting in, special taxi lights have been developed for this type of aircraft. The lights are smaller, weigh less than standard taxiing lights for larger aircraft and soon will go into production. . . . Fluorescent lighting for aircraft cabins is also one more step nearer actuality. Trial installations incorporating a special lighting circuit that permits use of 14-watt fluorescent lamps have been fitted in the cabin of the C-97 cargo giant.

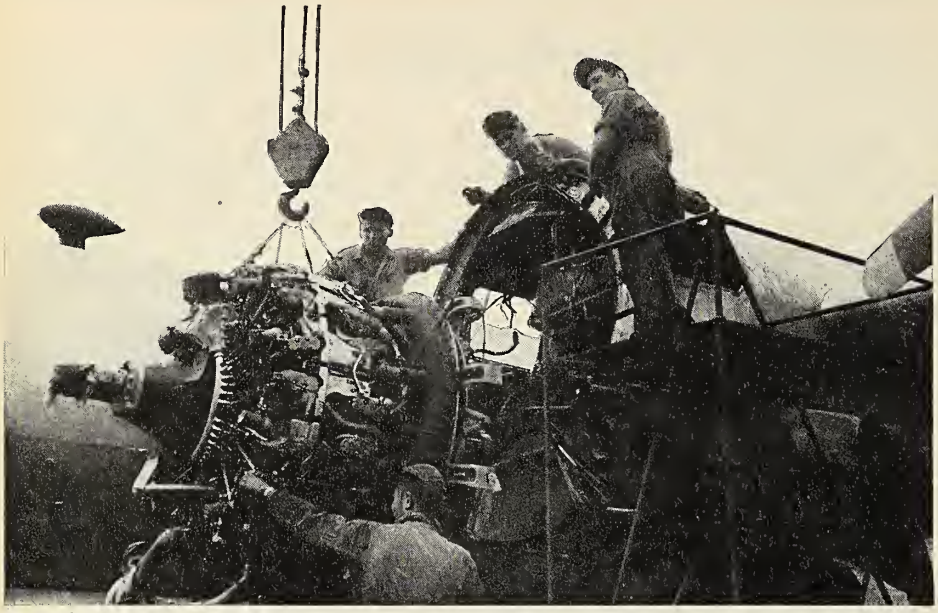
For more than two decades pilot seats in aircraft have been the same for all types—fighters, bombers, transports or liaison airplanes. Now, based on surveys conducted among flying personnel, seats are to be specially designed for each new type of plane. . . . For pilots who fly VLR fighters like the P-47N or P-51H engineers have developed special arm rests, cushioned and padded like the arm rests in an automobile.

To increase the barrel life of aircraft machine guns, armament engineers are running a series of tests with new cooling systems. One method is to wrap the gun barrels with a cover saturated with a low temperature chemical. Another system automatically squirts a chemical coolant into the gun bore after each round of



fire. Different alloys and plating inside the gun bore also are being tried.

Removal of some equipment on one B-29 airplane has permitted installation of a high-speed camera for taking pictures of ejected shell cases and links from the nose turret. This photographic record may help engineers to find new methods for eliminating the danger of empty cases striking the skin of the big bomber and causing unnecessary damage. . . . Present type "Focalscopes" which aid in focusing the lenses in big aerial cameras have been modified to permit focal adjustment on latest aerial cameras having long extended lenses. . . . Installation of a Gunsight Aiming Point Camera in a glider has been accomplished to record instrument readings during flight. The camera, operated by remote control, is fitted with a lens of suitable focal length so that each picture frame covers the entire instrument panel.



B-29, forced down on Okinawa, gets a new engine, flown in during the heat of the campaign.

Okinawa Engine Change

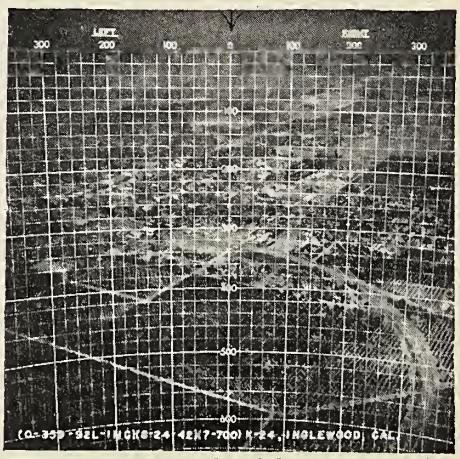
The first B-29 to land on Okinawa during the rugged campaign, came down on Yontan airfield very much against its will. Number two and number three engines had failed, and the plane was forced to make a landing during the heat of the battle, when Jap raids could be expected at any time. Lt. William E. Robertson, pilot of the plane, ordered his radioman, S/Sgt. Joseph M. Morin, to put through a message to headquarters, and after several attempts were jammed by enemy interference, the 21st Bomber Command finally received the call for assistance. One week later the Superfort was on its way home with two new engines—but it took the combined efforts of the AAF, including ATC, and the Marines to make its return possible.

The commanding officer of a Saipan-based service group, was ordered to organize a mobile repair and maintenance unit and get it—together with two new engines—to Okinawa with all possible speed. Three different AAF organizations were drawn from and personnel were brought in by air in record time. Although experts in their specialties, the men were hampered by lack of heavy equipment until the Marines provided a C-2 hoist and a local fighter outfit furnished two crew stands. Then, working through rainstorms and interruptions caused by enemy strafing and bombing attacks, the two defective engines were removed from the plane and torn down. At the proper time, two ATC C-46s landed at Yontan with the new engines, together with a fork lift, and despite the discomfort of the weather and the fact that they were well within Jap artillery range, the men proceeded with the operation. Problems were solved in ingenious ways, with the barrel of a Jap gun used as a prop bar and a pre-oiler made out of tubing from an enemy plane—and finally the engines were installed and the plane successfully flight-tested for its long hop back to Saipan.

"Checkerboard" Photo Prints

A new aerial photographic technique in which a grid is placed between the negative and the print paper so that a "checkerboard" screen is superimposed on the picture, recently enabled observers and ground fire control officers to direct artillery fire and spot hits visually with a minimum of mathematical calculation.

The fire control system permitted an aerial observer to have an oblique, charted photograph of enemy positions before him, whereas previously only vertical maps were available. And with the six-mile photostrip of enemy terrain before him, including all up-to-the-minute changes, he could signal to the ground station as to what square to sight on, while artillery personnel found the intersecting lines and by simple triangulation determined the distance, elevation and direction of the target.



With grid screen placed between negative and print during developing, airphoto of terrain is charted to increase accuracy of artillery.

Super Power Plants

AAF engineers, working in close conjunction with aircraft engine manufacturers—who labored for two decades to produce a successful 1,000 hp power plant—have outdone themselves in the last 36 months to perfect designs that are capable of generating 3,000 hp. One of these is the in-line, liquid cooled, 24-cylinder Allison V-3420.

Although there has been much talk about these super-engines, it was not until recent months that such high hp ratings actually have been obtained in flight with a conventional engine. To get 3,000 hp from a liquid-cooled engine, experts took two V-1710s like those in the P-38 and geared the two crackshafts together to drive a common shaft. The Allison has a smaller frontal area, being small enough for enclosure inside a large wing, and can drive either tractor or pusher, single or dual rotation propellers, and can employ extension shafts to allow for remote propeller drive. A feature of the V-3420 is that nearly all of its parts, except the crankcase castings, are identical with those of the V-1710 engine, now in service, and this interchangeability will keep production costs at a minimum besides simplifying maintenance.

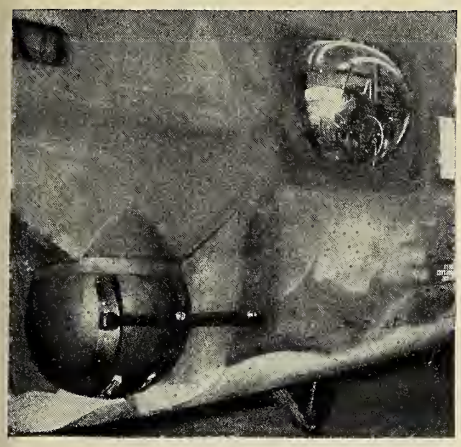
The basic accessory housing of the inline engine incorporates a single-speed, single-stage, gear-driven supercharger for low or medium altitudes, but an auxiliary turbo-supercharger can be utilized for increased high-altitude performance.

The engines have been graduated with honors from preliminary tests at Wright Field's Power Plant Laboratory. And with the goal of 3,000 horsepower having been attained, designers and manufacturers are combining new fuels, water and fuel injection systems and large-type engines in the hope of producing a 4,000 hp power plant before long.

Waist Gun Turrets

Originally worked out as part of a weight-slashing program for B-24s, small waist gun turrets, each with a remotely controlled sight, have been de-

vised for installation on the sides of Liberators and have succeeded in cutting about 470 pounds from the gross



In an effort to reduce overall weight of the B-24, remotely operated waist gun turrets have been installed on an experimental model.

weight of the plane without reducing the number of guns. Sighting stations are just aft of the turrets and each provides vision over half a hemisphere.

So far the modification has been put into effect on only one B-24, which is being used as a laboratory to test the equipment. It has been found that although the two-gun turret makes up for the loss of firepower caused by the elimination of the conventional ball turret, the field of fire of the new turrets does not permit shooting straight forward or directly to the rear.

Hurricane Reconnaissance

For the purpose of determining exactly how dangerous tropical hurricanes are to aircraft in flight, four B-25Ds and their crews were recently assigned to the AAF Weather Wing to fly directly into storm areas and report on the extent of the "unflyable" weather.

Each crew consisted of pilot, copilot, navigator, weather officer, radio operator, engineer and crew chief. Extra gas tanks were mounted for long range cruising, and because there was insufficient time to install other meteorological devices, a B-3 driftmeter was the only special equipment carried.

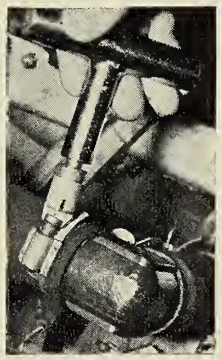
The Army Hurricane Weather Officer at Miami, Fla., determined the approximate routes to be flown, after coordination with the Navy and Weather Bureau Hurricane Liaison Officers at Miami. Variation of flight plans, to obtain a maximum of information during the storm, was made on recommendation of the weather officer on board the plane, who also made observations on clouds, weather and surface winds over the ocean. The posi-

maintenance tips . . .

from the crew chief's stand

Many B-29 URs have been received lately concerning feathering pump and motor failures. In most cases such failure has been caused by improper ground operation, and mechs are cautioned to eliminate prop feathering operations on the ground except where absolutely necessary, and to take special care to see that the unfeathering cycle, when it must be performed, is conducted properly. When a Superfort returns to base with a feathered prop, therefore, follow the approved ground unfeathering procedure and remove the front sump plug, unfeathering with a wooden blade wrench. Do not unfeather electrically.

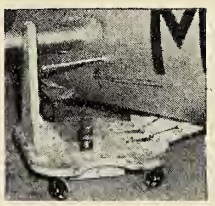
Now available through Air Corps Supply, is a torque indicating hose clamp that is expected to have a wide application in complying with TOs. The tool is designed to adjust hose clamps to proper torque value and is operated so that when the desired torque has been reached, as indicated by numerals stamped on the load seal at the end of the "T," the handle will move freely in a 90-degree arc before again applying force. In recent tests conducted by the AAF Proving Ground Command, the handle operated satisfactorily after being immersed in water for 30 minutes and after a soaking in SAE No. 30 oil for 10 minutes. It was also dropped five times from a height of six feet onto concrete with no apparent change in the torque value reading.



The complete kit contains two of these handles—one 15-inch pound and one 25-inch pound—a 9/32" hose clamp, a socket wrench and two flexible extensions for use in places where the T-handle is inaccessible alone.

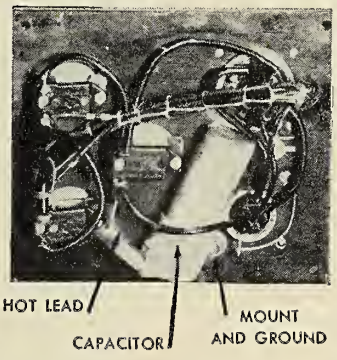
"What, oh, what is to be done with rescinded TOs?" seems to be heard rather generally in these days of redeployment. The best available authority—TO 00-5 itself—says that, in general, TOs will be retained as long as the relevant aircraft and equipment is in service. Rescinded TOs, however, will be removed from the files and will be retained separately for reference purposes in area Air Service Commands and Air Depots for a minimum period of two years following rescission. All binders as well as each individual TO will be plainly marked to indicate that they are rescinded publications.

A free-wheeling tail dolly may be made out of scrap lumber, hooks, hinges, casters and a hydraulic jack, as shown above. The model illustrated was constructed by production line maintenance men at the Chico, Calif., Basic Flying School.



On P-61Bs, pilot's and gunner's hinged windows may be blown open by blast from turret guns, due to vibration set up by firing of 20 mm cannon. Service activities experiencing such difficulty in keeping the windows latched, should locally fabricate latch pins slightly longer than those currently used in order to improve the registering of the pins in the locking holes. New latches should be fabricated of aluminum alloy, Specification AN-A-11A in accordance with Northrop Drawing No. 105916, except that the dimension from the centerline of the lock should be increased to 15/16".

During bombing missions, it may be found that when the bombsight switches are turned on in B-25s it will greatly increase the noise level in the headsets on command position. Not only will the added noise be hard on the ears and nerves of crewmen, but at high altitudes it may interfere with radio reception. On investigating the source of the trouble, Capt. Irwin S. Erdman of an AAF proving ground detachment found that the noise is caused by inadequate shielding of wiring, which allows the static from the arcing of motor brushes and governor points of the bombsight to pass into the command radio equipment. He therefore recommends that a low voltage, 0.5 MFD capacitor be mounted behind the stabilizer switch panel, with the case being grounded to the panel and the lead connected to the hot side of the bombsight switch. He reports an 80 percent improvement.



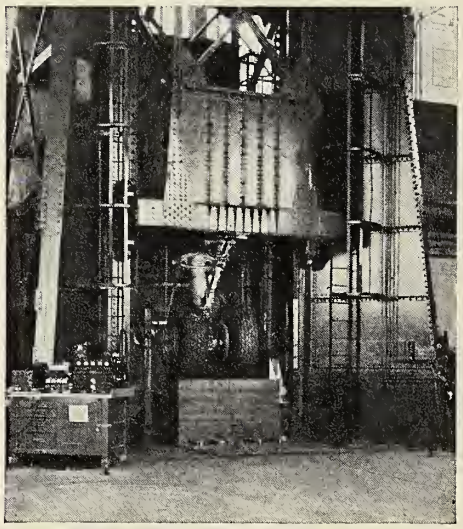
tion of the aireraft and wind measurements were determined by the navigator, who relayed this information to the weather offieer by interphone. This data was then eoded in WAF-2 and relayed to the radio operator for transmission to Miami Hurrieane Center.

Flying eonditions encountered in the storm areas varied with eaeh storm, but some eonsistent eharaeteristies were observed whieh, aeeording to Maj. I. Irving Porush, Army Hurrieane Weather Offieer, permit eertain generalizations to be made regarding the type of weather eneountered. These embraeed stratiform clouds making for relatively smooth flying between layers, squall lines forming south of the storm eenter, greater eumulus and cumulo-nimbus aetivity in the formative and immature stages of storms than in the mature stages, and relatively favorable flying conditions in the approaehes to the storm area and often within the storm itself. It was found that most storms had a very small eenter, and that it probably would not be eneountered at 200 mph or more.

First Lt. Otha C. Spencer, who piloted one of the B-25s, reported the following effeets on the plane: Water entered the airseoop and eaused a leaning-out of the fuel-air ratio. Water also penetrated to the magneto rotors, cannon plugs of the eleetrieal wiring, spark-plug shields and eolleeted in the rear tips of the engine naeelles. Clogged pitot lines resulted in erratic altimeter and IAS readings, while eylinder head temperatures dropped from a normal reading of 180 degrees C to below 100 degrees C. In addition, loosened rivets were noted along the nose seetion below the pilot's and eopilot's windows, as well as eraeks in the engine ring eowling, eraeks in the vertieal stabilizer and loosened control eables.

Landing Gear Drop Test

Although still used for struetural tests, engineers at Wright Field's Structures Test Hangar have abandoned the "hanging" method for funetional drop tests of landing gear. Instead, new test maehines hoist up landing gear assemblies separately, then drop them with impact forees simulating actual landing. The method is more aeeurate, requires less time and ean be eondueted before the airplane itself is eonstrueted, enabling proven landing wheels to be installed without further test.



Landing gear assembly is raised to height of 55 feet in drop test, then brought down with simulated impaet of actual landing.

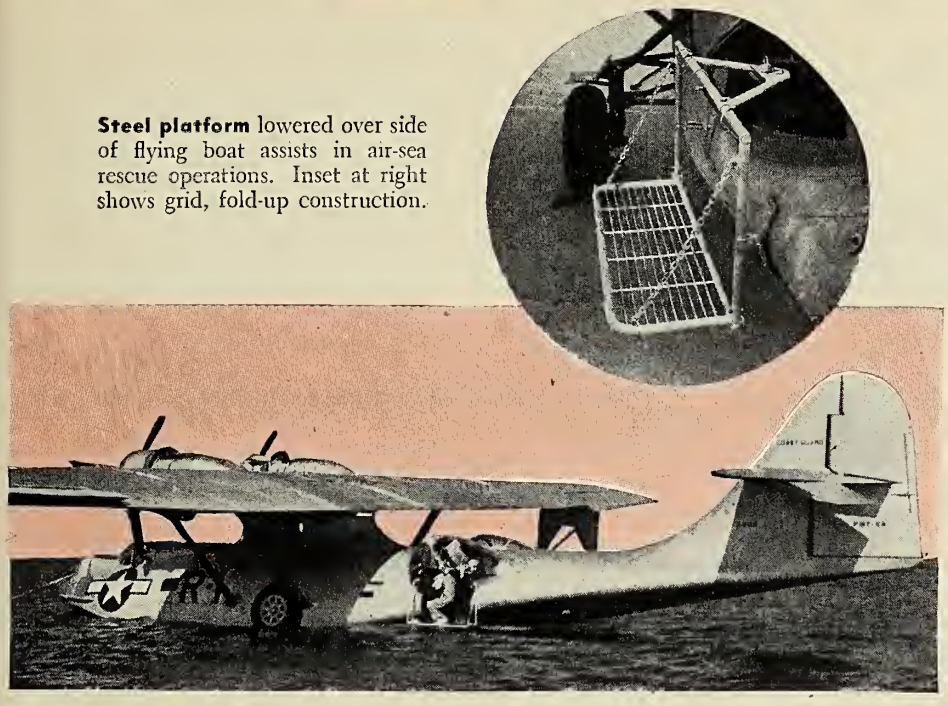
A large steel bucket, filled with buckshot to simulate the total gross load of an airplane, is bolted to the landing gear strut of a eomplete wheel assembly. A wineh hoists the loaded bueket and the gear to the desired heighf for the test, then drops the rig by a hydraulie release meehanism, while a spaee-time camera shoots a continuous reeord on a graphic film, showing how far and how fast the gear drops. Strain gauges measure the loads.

When the wheel is dropped, it strikes an inclined platform which simulates the knee-like baekward bending aetion of a landing gear strut during an aetual set-down. For some tests, a small eleetrie motor starts the wheel spinning in reverse before it is dropped, thus reproducing the effeet of speed.

Four of these drop test maehines are installed at present, and they range in size from a giant that ean test the undercarriage of a 500,000 pound airplane to a midget for testing nose and tail wheels. The largest one towers 55-feet above the hangar floor—so high that a hole had to be eut in the roof and a copula built to aeeommodate its protruding members.

What's Wrong with this picture?

"Look at the birdie" for a few moments and if you click with a pic you'll see that these photo maintenance men are doing things with their camera equipment that are strictly for the birds. At least 10 shutter shudders are being committed, but don't take off on a reeonnaissanee mission to Page 71 to see what deveiops until you've snapped a few more exposures. The aeeentuators of the negative are (from left to right) T/Sgt. Earl Schoen, T/Sgt. Cecil Morrison and Sgt. E. Gardner, all of Photographie Laboratory, Engineering Division, Wright Field.



Steel platform lowered over side of flying boat assists in air-sea rescue operations. Inset at right shows grid, fold-up construction.

Sea Rescue Platform

A collapsible, lightweight steel-grid platform attached to the gun mount in the blister of an OA-10 flying boat is now dropped over the side in air-sea rescue operations to help crash victims into the plane. Capable of supporting four men, the platform folds up like a cot when not in use and can be easily stowed inside the hull near the gunner's position. During a rescue, it is held in place by a large steel pin inserted through the gun mount, and by two brackets on the hull itself.

The device was built by the Consolidated-Vultee Aircraft Corp. and may soon become standard equipment on all OA-10 rescue craft.

Helicopter Rotor Test Rig

As part of an extensive helicopter development program, engineers at Wright Field are studying rotor rpm, thrust, torque and coning angle of blades on a specially designed rotor test rig that makes possible continuous research on the ground in any kind of weather and without the risk involved in actually flying. (See Technique cover.)

The whirl test stand consists of a large rotor support made of concrete and steel and a special gear for transmitting power to the rotor from two 300-hp motors. A soundproof, thick-walled control room is provided, and a 12-inch thick oak plank barricade stops pieces of blade when the rotors fail during destructive tests. The rig can whirl rotors larger than any now in existence—up to 80 feet in diameter—and spin them at speeds up to 500 rpm, which is more than double the maximum rotor speed of the Sikorsky XR-5.

With a series of dials, switches and nobs in the control room, test operators can simulate any condition of hovering flight for the helicopter. In a few seconds they can get the rotor up to 300 rpm or accelerate it to any rate desired, and through an observation window they can measure the coning angles of the blades with an ordinary surveyor's level. High-speed cameras are able to photograph any attitude of the blades, and special calibration instruments and gauges measure torque, establish strain in material, indicate rotor rpm and permit calculation of lift forces.

A routine test procedure is to run a calibration test which enables engineers to plot performance curves of thrust and torque versus rpm at various pitch angles. This is followed by an endurance test in which the motor is turned to slightly above normal operating conditions for 100 hours. Then comes a full hour of rotating at excessive speeds, after which the rotor, in many cases, is whirled to destruction.

New Horizon Indicator

An electrically operated Universal Attitude Indicator which will not tumble during aerobatic maneuvers has been developed by Sperry and the ATSC Equipment Laboratory at Wright Field for installation in all fighter planes, including the Black Widow. The indicator will supplant the gyro artificial horizon, and although it involves new techniques in instrument flying, experienced pilots will need only a few minutes to acquaint themselves with it.

The old gyro horizon would tumble in any dive steeper than 60 degrees and in any bank or roll beyond 100 degrees, while the new instrument allows a 360-degree freedom about the roll and pitch axes of the plane. Moreover, it has a "gimbal lock" which eliminates having to cage and uncage in near vertical dives or climbs.

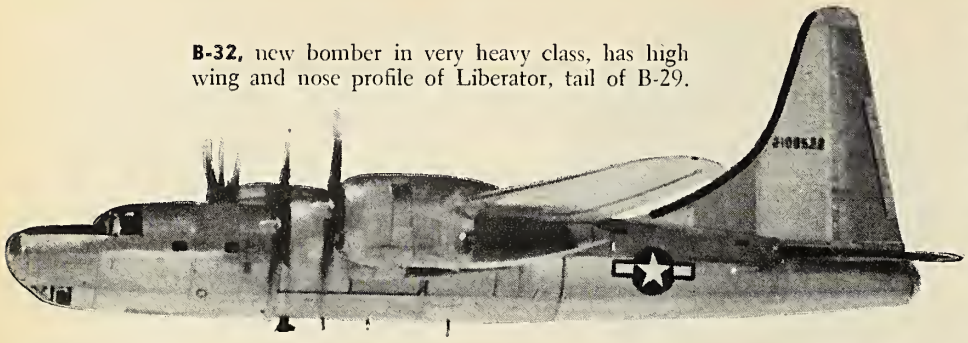
A further difference is that indications are read in a pattern rather than from a line. The stabilized unit is a ball, the upper hemisphere of which is painted black and the lower yellow, with DIVE being printed on the black portion and CLIMB on the yellow. With black showing, the pilot is diving and with yellow visible the plane is in a climb, while in inverted flight the words will appear upside-down. Graduated lines, smaller toward the poles, indicate the angle of dive or climb, and a pilot returning to level flight would fly toward the larger lines on the sphere. The bank scale is the same as in the gyro horizon.

The Universal Attitude Indicator is operated by three-phase, 400 cycle, 115 volt AC, and this use of electricity over the vacuum system of the conventional gyro horizon will give the instrument greater longevity and permit its use in low temperatures at high altitudes. The indicator can be immediately installed in planes having suitable power sources and can be placed in others after modifications. It will be especially useful in the cockpit of jet craft.

New Valve for Oxygen Units

To prevent flak hits from ruining a plane's oxygen supply, the medical section of the Air Service Command, USSTAF have devised an oxygen valve system which provides check valves at regular intervals along the oxygen feed lines so that the network does not go entirely dead when a hit on any of its parts is sustained. In present high-level flights, when a link in the oxygen chain is broken, the check valves protect the supply for the rest of the crew while the affected member, whose mask has gone dead, uses an individual oxygen bottle during the balance of the mission.

Although perfected for use over Europe, the arrangement was utilized in the Pacific air war.



B-32, new bomber in very heavy class, has high wing and nose profile of Liberator, tail of B-29.

B-32—Liberator's Big Brother

The Consolidated-Vultee B-32, latest of our heavy bombers to join the Pacific air fleet, has been designed to take up where the B-24 ends. Originally planned as a larger version of the Liberator, including its twin-ruddered tail and high wing features, the present model is actually a compromise with the B-29, since its tail height of 32 feet compares most favorably with that of the Superfort. In bomb load, speed and range, too, the B-32 is similar to the other, but in size it is somewhat smaller, being 15 feet shorter in fuselage length and 6 feet less in wingspread. Locally operated turret design, indented windshield and the high wing are also distinguishing characteristics.

Maintenance ease and accessibility has received major attention from the designers of the B-32, and engine nacelles are interchangeable at any of the four positions. As a time-saving advantage, it has been demonstrated that a complete engine nacelle, including all accessories and the prop, may be removed from the plane by four men in 1½ hours, cutting the time for a similar job on the Superfort by several hours.

New Versions of P-38

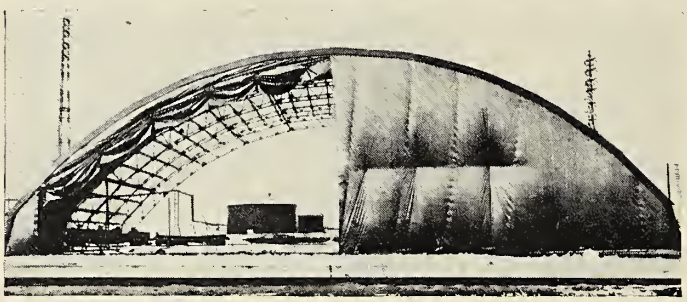
Two new types of Lightning fighters are taking their place in the AAF's scheme of operations—a modified P-38L with two cockpits and special equipment for night fighting and a pathfinder Lightning.

To turn the "L" into a night fighter, engineers moved the cockpit seat forward several inches and added another seat for an observer. The canopy was modified so that the extra passenger could sit upright in a standard seat, and separate escape canopies were provided for both pilot and passenger in cases of emergency. Armament installations remain the same as on the standard fighter model, and it is possible to carry externally hung bombs or fuel tanks. The whole modification adds approximately 500 pounds to the fighter, but has very little effect on its combat performance.

For the Pathfinder installation, special equipment was placed in an elongated nose section and the plane acts as a lead ship, aiming bombs for the entire formation.

Glass Cloth Hangars

Glass cloth, woven of glass fiber yarns and coated with synthetic rubber, or resin, is being used by the AAF for curtains, side walls and ends in newly built hangars at advanced airbases. Structural steel framework and the glass cloth are shipped as a unit, saving shipping space and weight and speeding construction time.



To combat fungi in tropical areas, special fabric made of coated glass fibers now serves as sidewalls and ends for new AAF hangars.

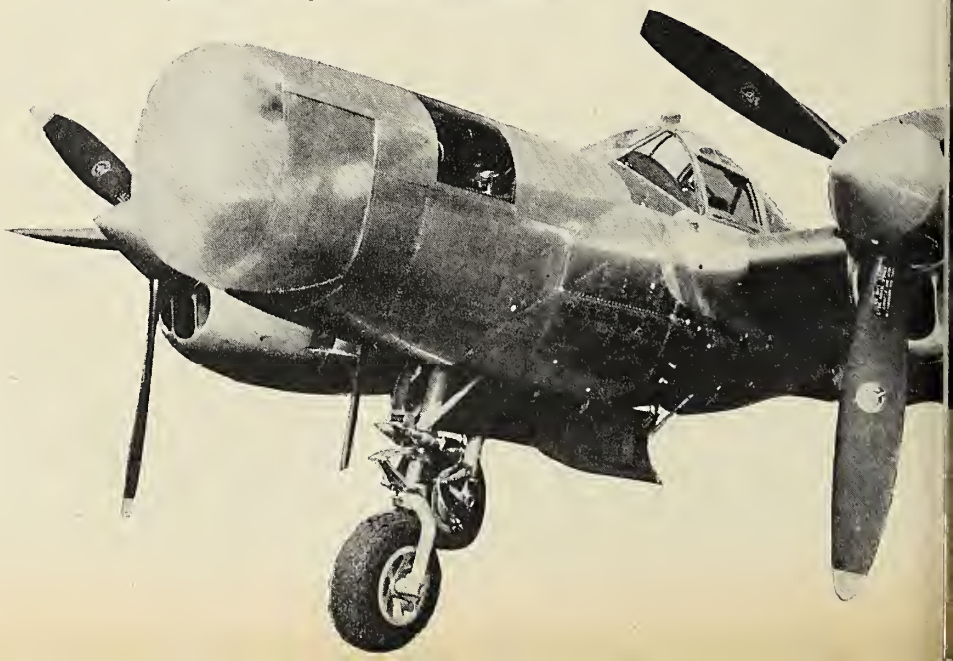
Glass cloth was found to be desirable for this use because of its resistance to the effects of mold and fungi, high strength in proportion to its light weight and the ease with which it may be fitted around a plane's fuselage. Canvas duck, previously used, was subject to rot from tropical dampness, while in Arctic regions would become semi-rigid due to the extreme cold. Glass cloth, on the other hand, has excellent weathering properties and is not affected by extremes of temperature.

Fuel Flow Meter

Flow meters that measure the exact amount of fuel consumption for each engine of the C-54, C-82 and B-29, and visually indicate the figure on an instrument dial, are helping to conserve gasoline on long-range flights. Unaffected by changes in temperature or altitude, the meter provides data to enable a pilot to adjust his mixture controls to obtain maximum power from every gallon of gas.

The Fuel Flow Meter consists of a transmitter and an indicator dial operating on 26 volts from the plane's electrical system. The transmitter has a special fuel-flow measuring mechanism that works like a gateway and is mounted between the fuel pump and the ear-

P-38 with special equipment in elongated nose is pathfinder for formation.



buretor on each engine, being wired to the panel-mounted indicator.

Two needles on the dial of the indicator record fuel flow to a pair of engines, and in four-engine planes there are two indicators on the instrument panel. Calibrations on the dial show the rate of flow in pounds and gallons per hour, and graduations range from 100 to 3,000 pounds, or 17 to 500 gallons—enough to record even the highest rate of fuel consumption estimated for future big bombers.

At present, three types of flow meters are in use, but all operate on the same principle. Only the dial faces are different and these vary according to the airplane and its known fuel consumption. The latest type, still experimental, will have an automatic counter which indicates on the dial the total number of gallons of fuel consumed from take-off to landing. ☆

WHAT'S WRONG with the picture on Page 68

1. Using pliers to tighten bolts, as the man at the left is doing, is likely to ruin the expensive K-22 aerial camera. As TO AN 10-10AC-13 points out, use the regulation kit.

2. The slightest jar will knock down the small window glass that is leaning against the camera on the ground, breaking it or impairing its properties of clear vision.

3. Cameras weren't built for men to stand on, as the man at the right is doing.

4. The sergeant at right is holding a K-17C camera by its electrical power cable. This is meant to furnish power to the camera mechanism, not to serve as a handle.

5. He's also smudging the window in the plane's nose with his hand. Dirty windows mean fuzzy prints.

6. The man on the ladder is cleaning a lens, but it's not supposed to be done with a cap. Special tissues are provided for this purpose and should be used.

7. The toolbox on top of the nose is in a precarious position and could easily fall on a man or camera.

8. There's a camera magazine on the wing at left. That's no place for a piece of mechanism so delicate and precise.

9. Coming back to our squatting friend, that screwdriver on the K-22 can easily topple down onto the lens and damage it.

10. Look along the ground to the right, and you'll see a camera magazine lying face-down on the concrete in such manner that its machined surface may be easily marred.

on the line

with mechs around the world

The rip-cord cable on B-8 type parachutes won't tangle with downcoming pilots now that Pfc. Walter Criswell's idea has been adapted at an overseas Air Service Command base. As shown in the picture, the device is simply a canvas loop sewn into the shoulder harness of the parachute through which the cable is passed to keep it from interfering with free head movement.

In the Philippines, photo technicians of the 13th Air Force Bomber Command realized the need for simplifying the settings on K-17 and K-18 cameras, and therefore developed a ring and bead sight that approaches the operating ease of a Brownie camera. Three fixed settings—clear day, dark day and through broken clouds—enable the camera to provide excellent pix. Instrumental in the construction of the sight and mount were S/Sgt. Willis Andre, Los Angeles, Calif., (holding camera) and Lt. Frederic Ford, Charlotte, Vt., supervising installation.

The unusual device in the left hand of S/Sgt. James J. Vokoun, Prentice, Wisconsin, is a specially made propeller wrench which he designed out of salvage materials for use in securing four-bladed props to the propeller shafts of P-51s at his 8th Air Force fighter station in England.

"Don't strain, get a crane," reads a sign in the manufacturing and repair department of an overseas ASC depot where S/Sgt. Joseph Flitter, LaPorte, Ind., helps repair battle-damaged propellors for re-use against the enemy. And Sergeant Flitter, watching his fellow specialists do consid-

crable straining as they removed the 500-pound props from high-wing heavy bombers, went the sign one better. Combing the salvage hangar for a B-17 bomb-hoist unit and a B-24 landing gear retraction mechanism, he was able to convert a standard-model tug into a mobile hoist-and-boom unit with which two men can now drive up to a grounded plane, remove the damage prop and carry it back to the repair shop in a mere 45 minutes as against a previous three-man job that required fully two hours. The boom assembly is raised and lowered into position by a cable attachment.

The "Thunder Dragons" Fighter Group in China must operate from forward fields where facilities are frequently negligible and air lift tonnage must be kept at a minimum. Accordingly, Capt. George L. Timme, Jr., Glenside, Pa., had to keep size, weight and portability in mind when he decided to construct a radio control tower to fill in until a more permanent structure could be built. Scaling at less than 400 pounds, the unit mounts a transmitter-receiver, aircraft battery, generator, a 10-foot collapsible aluminum antenna and a microphone and headset which can be used away from the generator by means of forty feet of cable.

Spurred on by the report in the November, 1944, AIR FORCE, of the prowess of Lightning fighter No. 42-12694, assigned to the 13th Air Force, the men of the Philippines-based 5th now claim they have the new longevity champion. She is P-38 No. 42-12985, converted for photographic work, and has rung up 929 hours of active duty, flying high altitude recco missions over Wewak, Madang, Hansa Bay, Hollandia, Kavieng and elsewhere. Her crew chief is T/Sgt. Herbert G. Roose of Bellingham, Wash.

PRIVATE AIR FORCE

(Continued from Page 59)

to an officer. "Sir, I have information of value to the Air Force. It's about my home town of Fulda, in Germany. I have been watching the newspapers, and Fulda never has been bombed. Yet there is a ball bearing plant there—Gebaur & Moller—and our bombers are attacking ball bearing targets. And the Gummiwerke Fulda A G is a rubber factory. There is an enamel factory that probably is making war materials now. I know the location of those plants."

The officer was interested. He suggested that the soldier see an intelligence officer. Two days later Pvt. Erwin Weinberg found himself transferred to headquarters of the U. S. Strategic Air Forces in Europe. He talked with Maj. John H. Simone. The major definitely was interested. He called for the target folder on Fulda. Intelligence data showed that a ball bearing plant was known to exist at Fulda, but its location was unknown. Intelligence was not sure which of two factories was the rubber plant.

To prove he knew what he was talking about, the private took pencil and paper and drew a rough sketch of the location of the two plants in relation to roads and rivers. Satisfied, the major requested air reconnaissance of the target.

The air forces were busy at the time, preparing the way for D-Day. Other reconnaissance targets had higher priority. Erwin Weinberg worked as interpreter and file clerk for reconnaissance pictures. He hoped each new photo would be Fulda. Meanwhile the attack on ball bearings was discontinued, its purpose of impairing the production of ordnance and aircraft having been achieved. Weren't they ever going to bomb Fulda?

Then one day the major called him in and handed him reconnaissance photos of Fulda. "Can you pinpoint those targets?"

"Yes, sir!" Private Weinberg circled the ball bearing factory, the rubber plant and the factory that had been making enamel.

And then, finally, in August, the major called him in again, and showed him more pictures—strike photos of bombs exploding in the rubber plant and marshalling yards, a reconnaissance picture taken afterwards showing damage. The heavy bombers struck Fulda twice more in December, again in January 1945, and in March. The 9th Air Force sent medium bombers to hit it a last time in April.

Erwin Weinberg collected spare pictures of the bombing of Fulda. His own target, bombed six times on the basis of information he had delivered. The one picture he likes most of all shows where a bomb spilled over the target and made a direct hit on his father's house. This was the house the Nazis took without payment.

"But they never really sent much strength over my target," he says disappointedly. "Never more than 100 bombers or so at a time." However, even that is a pretty fair air force for a GI.

"I think I did all I could for the Army," he says. Few will question this. He is now a corporal, though he doesn't connect his advancement with his contribution towards the destruction of the Fulda targets. He says it's just the T/O.

His one remaining goal on this side of the water is to engineer an inspection tour of his air campaign. He wants to walk over the ground and examine the bomb craters and the demolition. By the time you are reading this, the corporal probably will have realized his ambition. ☆

BEACHHEAD CARAVAN

(Continued from Page 27)

The biggest problem was the placement of operating positions in the receiver trailer. T/Sgt. Bill Rivers of Baltimore, who had been transferred from the crew to another important job, figured out the answer. There wasn't room in the trailer for all the cabinets, desks and chairs—plus the operators. Something had to be cut. Rivers found that one table could be made to do for two operators if he placed the positions side by side facing in opposite directions and separated by a common table with two keys.

Then came the Malabang campaign and the experimental mobile unit was pushed to completion, minus frills and fripperies, but with all the basic innovations. While they began work on the final model, members of the crew sweated out the answer from the task force. The first report came through: "Operation 100 percent successful. Thank God for smooth roads."

The unit had passed the test, but the heavily-packed trailers had proved top-heavy. The solution was to mount everything so that even if the trailers tipped over the equipment wouldn't be ruined. When the final model was road-tested, the equipment held but a wall clock tore loose. All clocks then were mounted on rubber pads, and on the second test they didn't even wobble. That just about completed the modifications necessary to fullfill the requirements of large-scale invasions ahead.

The mobile unit is poised for new beachheads, this time on the Jap mainland. Its development has meant a lot of headaches, but was well worth them, for the trailers will save time, lives and equipment. The headaches of the AACS men were cured with a few hours' sleep. For the Jap, the headaches are just beginning. ☆

Rendezvous

(Continued from Page 3)

mixed. What will the octane rating be? Will it have any effect on an aircraft engine?

Pfc. Thomas A. Ashley,
APO 858, c/o PM, New York City

ATSC says the cost of the original B-29 was $3,382,396.90, with the current production cost approximately $500,000. ATSC experts, again, state that an equal mixture of 91 octane and 100 octane fuel will produce a performance number fuel of 95/112, or an octane rating of 95. In case you are more than academically interested, use of such mixed fuel in a 100-octane engine would cause detonation, piston burning and overheating. Take a look at Tech Order 06-5-1 before mixing.—Ed.

Treating a Plague

Dear Editor:

I'd like to have you clear up a few points for me, if you'll please.

As you know, GIs are known the world over for their "bull sessions" which eventually lead to heated arguments. These are questions that have plagued my buddy and me and I'd like to have them straightened out before we become enemies: Has North American redesigned the wing dehideral of the B-25 lately? Have the latest B-25s still retained the "gull wing" dehideral, or has it been changed?

Pfc. Joe Senjanec,
APO 360, c/o PM, New York City

Spars and ribs in B-25 wing structure have been "beefed up" to increase the safety factor, but the wing's external appearance hasn't been noticeably altered—still the "gull-wing" design.—Ed.

A Case of MEs and JUs

Dear Editor:

Looks like the shot on Page 15 of the July issue really belongs on Page 52 under the heading of "What's Wrong with This Picture?" The two glaring mistakes noticed by the aircraft recognition department of Langley Field are that the plane you identify as an ME109 is really an FWI90, and your JU88 is really a JU188.

Langley Field Recognition Dept.,
Langley Field, Va.

Dear Editor:

If that Jerry plane . . . is an MEI09, I'll not only eat the ME109 but I'll also eat the JU88 it carries, bombs and all. . . .

Pvt. Ben Grossman,
Squadron D, 243rd AAF Base Unit,
Great Bend, Kan.

The pickaback experts assure us that the Germans concocted several varieties of this makeshift weapon—ME109 and FW190 having been combined with several versions of the JU88, and (according to one report) an FW190-HE111 pickaback having appeared in numbers on one occasion. Of these combinations, however, the ME109-JU88 was much the most common. As for the dual affair pictured in the July issue, top plane is indeed a Focke Wulf; the lower one a JU88G (that is, a JU88 with 188 tail design).—Ed. ☆

WELCOME TO DULAG LUFT

(Continued from Page 17)

Eagle-eyed officials at Dulag Luft could easily identify a prisoner from the 91st Bomb Group if he had one of these pictures in his possession. Photographs carried by personnel from this group had a peculiar brown color. Snapshots of 95th Bomb Group members also were a dead give-away. Every man in this group wore the same checkered civilian coat when he had his picture taken.

Officers' AGO cards often conveyed a number of helpful hints to the Germans. These cards invariably showed where the prisoner had been commissioned, and in some instances, where he had been trained. An AGO card issued at Langley Field or Boca Raton indicated its owner probably had taken blind bombing training. Naturally, the Germans subjected these particular POWs to intensive grilling.

Allied training operations always were a subject of prime interest to the Luftwaffe. Air training always is a good indication of what the opposing side has up its sleeve. It provides a reliable gauge of how fast replacements are coming in to take their place in combat; it also furnishes a tip-off on new weapons or tactics.

Dulag Luft interrogators found many of their captives willing to talk about purely training matters. Some POWs did not believe there was much military security involved in routine training activities since so much publicity had been given the training program during the early years of the war.

Considering the extensive volume of highly-secret operational data that constantly streamed into Dulag Luft it is a wonder that Allied air losses were not larger.

Frequently, the log books and briefing notes recovered from Allied aircraft contained remarks on the effectiveness of flak, smokescreens or other enemy defenses encountered during the mission. This made highly important reading for the Germans for it showed them the effectiveness of their anti-aircraft defenses.

Captured literature oftimes indicated the location of targets that were scheduled for Allied attack. Although the Germans once gained possession of the RAF's target folder, the dossier at Dulag was kept current largely through various fragments of information that come in from time to time.

It was not uncommon for large German manufacturers to ask the Luftwaffe if their factories were on the list, and if so, when they could expect to be bombed.

While interrogating prisoners, the Germans took great pains to impress them with the fact that there was little the captive could add to the Luftwaffe's already large stock of information about the Allied air forces. This was done with the obvious intent of inducing the prisoner to talk.

The majority of Allied airmen passing through Dulag Luft had undergone preliminary questioning by some German official agency near the point of capture. Results of this inquiry usually were sent on to Dulag before the prisoner.

Upon his arrival in Frankfurt, the average prisoner usually was placed into solitary confinement while the interrogators studied all the data available on him. Dulag Luft had a large biographical library, material for which had been obtained from various sources, including American and British newspapers and magazines. Service journals and army publications, found in great abundance in crashed aircraft and in the pockets of prisoners, always proved a fertile ground for biographical matter.

Dulag Luft's historical section possessed voluminous data on various Allied squadrons and groups, all of which was available to the interrogator preparing to question a particular prisoner.

For the most part, Allied airmen remained silent during the questioning process. Interrogators often threatened to call in the Gestapo when a POW refused to talk; prisoners arriving at Dulag Luft without identification tags were warned they would be shot as spies if they persisted in being uncooperative.

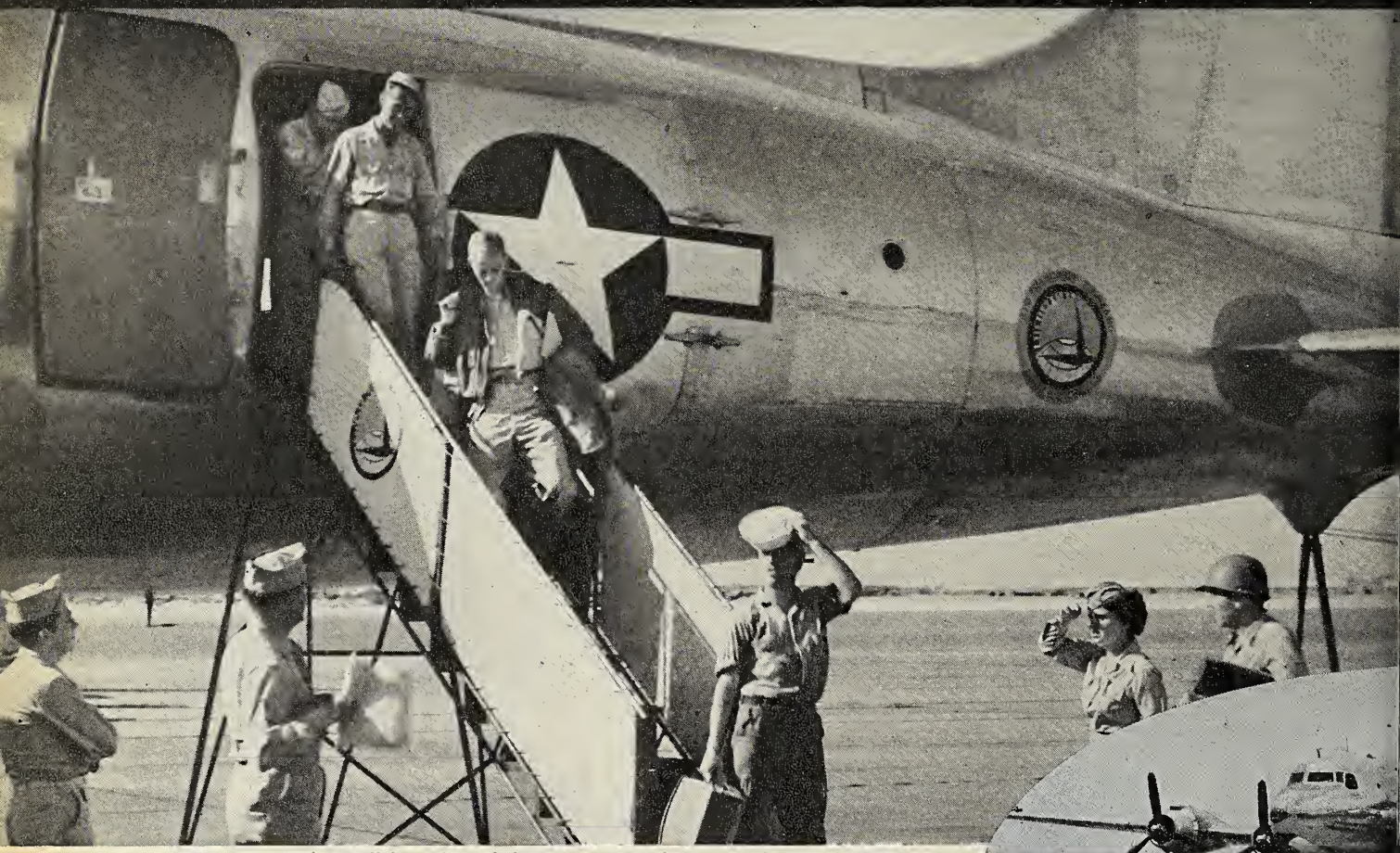
This sort of treatment was the general rule for the rank and file of air crews. Higher ranking officers, lieutenant colonels and above, were handled with more refinement. For them Dulag Luft reserved its "wine, women and song" method. It was customary to invite them to the officers' mess or to a hunting lodge near Frankfurt where their German hosts discreetly sought to pump them for information during the course of friendly conversation over the dinner table. In some cases, however, the Germans felt no compunction about throwing some of their high ranking "guests" into solitary confinement if they felt there was any chance of breaking down their resistance. Col. Hubert Zemke, commanding officer of the high-scoring 56th Fighter Group, said he spent nearly three weeks in solitary while the Germans tried vainly to make him talk about his knowledge of the Soviet Air Force.

But toward the close of the war, with defeat just around the corner, some of Dulag Luft's top personnel spent more time trying to ingratiate themselves with high ranking prisoners than they did to ferret out Allied secrets. One captured American colonel was offered the opportunity to escape to Sweden if he would agree to take along the two sons of an important Luftwaffe officer. On another occasion, several German Air Force officers asked their "guests" for advice on how to escape punishment when Germany capitulated.

The chief of Dulag's air documents section, now a prisoner himself, commented that captured air crew members simply failed to recognize the importance of the information that could be picced together from seemingly innocuous documents. In many cases, he said, the ordeal of interrogation would have been lightened for prisoners had their German captors not discovered some extra bit of documentary evidence which gave them a fresh lead or clue that otherwise would not have been obtainable. ☆

They all meet at Hickam

After V-E day the crossroads of the Pacific became the crossroads of the world



ATC brings personnel from all branches of the service into the terminal at Hickam Field

Customs inspects baggage for uncensored photos, classified documents, dutiable material

Somebody once said that if you sat on the veranda of Shepherd's Hotel in Cairo you'd meet everyone. However, he never stipulated how long you had to sit. But there is a guarantee now that you'll meet almost everyone in the U. S. Army who travels by air if you sit on the concourse of the new air terminal at Hickam Field, Honolulu —and you won't have to sit very long. For Hickam is the funnel through which all air traffic must pass between the States and any country or island in the Pacific. In June, 1945, over 31,000 passengers came through the ATC terminal at Hickam Field. As the redeployment of troops and aircraft from ETO to the Pacific stepped up this number was steadily climbing until within a few weeks it was more than double. ATC's Hickam operation has proven so successful that installations similar to this one will soon be erected at important ATC bases throughout the Pacific. ☆

Wounded from Okinawa and Guam are shuttled to another C-54, taken to San Francisco.

In addition to coffee and doughnuts, this canteen dispenses plenty of fresh pineapple.

The Intercom

As a medium for the exchange of ideas, AIR FORCE presents these answers to its Question of the Month. Replies are those of personnel recently returned from combat duty in the areas indicated.

QUESTION: What was the most interesting letter you received while overseas?

1st Lt. Emanuel Greenberg, communications specialist, 20th Air Force: "When I was in India, I received a letter from a friend of mine who was stationed only thirty miles away from me. But the letter had gone to the United States, chased me all around my past stations, and traveled more than 30,000 miles to end up just a short distance from where it had been written originally. The letter told me all about India—the monsoons, mosquitoes, and snakes — a laugh because I was right in the middle of them. Instead of answering it, I just went over to see my friend."

Maj. Sherman Wilkins, pilot, 20th Air Force: "A major I knew with a B-29 group in the states wrote to me when I was in India. He kidded me about what our planes were doing against Japan. He said that he had heard some place that some sort of airplanes which he assumed were Superforts had bombed Tokyo. At the time, we were the only outfit attacking Japan and he knew it. But he was always very envious that I had got into action before he did and he told me how much he looked forward to combat. It has a tragic ending, however, because he is now missing."

T/Sgt. Peter Perhach, radio operator, 8th Air Force: "I was sweating out my kid brother who was a radio operator in a tank on Iwo Jima. My sister wrote and told me that he had been wounded. Then I got a letter from him. He said that he had been hit but it was only a flesh wound and he was back in action. That was the best news I had ever received. I was wounded on my 20th mission and spent 5 long months in the hospital, but my brother really had the rough time. I certainly don't envy the ground forces. Give me an airplane everytime. It's much less dangerous."

Sgt. Robert J. Byrne, armorer, 5th Air Force: "I wrote to my girl and asked her to marry me. I certainly sweated out the answer to that letter. And it was sent just around the time when our mail deliveries were slow. The reply finally came—she said 'yes,' and we were married when I returned. I still have the letter. It took her eight pages to say she would be my wife. She wanted to know why I had never asked her when I was in the states. And she told me to return soon because she didn't want to have the longest engagement on record. Thirty-nine months later we married."

Sgt. Robert Krewson, gunner, 20th Air Force: "I had bailed out over China and my folks were notified that I was missing in action. I returned just two weeks later to find that our navigator had come back a day before me and he had wired the family that I was safe. Then I received a letter from them saying that they had the news of my survival. I had been worried about how the family would hold up under the shock of my being reported missing in action. When they assured me that they were all right, I certainly felt wonderful. That was the best letter I have ever received."

T/Sgt. Gailer Minster, gunner, 8th Air Force: "The news that I was the father of a son. The baby, John Frederick, was born on January 26 and I got a letter on the first of February. I had been on 26 missions when I received the letter, and I had been worrying about the baby and the missions at the same time. My wife told me that our 21 months old daughter thought that her new brother was quite a fine fellow and that everybody wanted me to get home in a hurry. Then I was even more anxious to finish my tour of duty. About a month later, I flew my last mission and returned."

ABC OF RADAR

(Continued from Page 20)

lot of different names for it, but at least we learned it wasn't Jerry."

And there was that "enemy convoy" on the Tiber. This was about three years after the Iceland fiasco. Late one afternoon during the critical days at Anzio, one of our radar stations there picked up a number of surface targets up north in the mouth of the Tiber that looked like enemy shipping. The group of ships appeared to leave the Tiber and swing out into the Mediterranean where they were tracked heading south in a sort of semi-circle toward Anzio. Forty-three "ships" were counted in the convoy as they showed up on the radar scopes.

The word was passed on to headquarters and some Spitfires were sent out to investigate. They returned about dusk and reported seeing nothing.

"What altitude were you flying?" the flight leader was asked.

"Ten thousand."

"Well, for hell's sake, how do you expect to spot a target at dusk from that height? Go back in at 300 and see what you can find."

The Spitfires flew back, searched the area and informed Anzio headquarters that they had located three small ships and had drawn fire from one of them. That was all.

But the radar continued to pick up the signals, the targets were being tracked at the rate of speed that ships would travel and everyone was getting worried. The Navy sent some PT boats to scout around. They found one enemy vessel and exchanged fire, claimed they could find nothing else.

By this time it was really dark, and PT reports or no PT reports, the convoy's tracks were only 12 miles offshore, heading toward Anzio. Fifth Army had not expected this sort of coup from the Germans and frankly were unprepared for it. Headquarters was in an uproar. Most of the artillery was inland in the front lines of course, so the antiaircraft boys began ripping down their sandbags on the seaward side and depressing their guns so as to be ready to fire on the surface ships.

All outfits had been alerted by 2100, and in the darkness they sweated it out. Minute by minute the radar tracked the convoy nearer. Just about the time that enemy guns could have been expected to fire on the vulnerable beachhead positions, the entire "convoy" came right in over the shoreline, floated directly over Fifth Army heads and turned towards the mountains, quite the most ephemeral ships since the Flying Dutchman. The 43 targets had been a nice cluster of wispy clouds at zero elevation which had rather inconsiderately behaved like an armada.

Radar is new, much of it is still in the experimental stage, and many of the sets have been constructed in a desperate race against time and the enemy. A good deal of it is still an unknown quantity—even for the experts—and radar men have learned that the only thing they can take for granted about it is its unpredictability. This, they are quick to point out, can be chalked

up, not to any shortcomings inherent in the radar, but rather to the failure of the men themselves to comprehend completely all its complexities. Sensitive to any aspersions cast in the direction of their sets, experienced radar men will argue, "There is nothing wrong with the equipment. It is as nearly perfect as scientists can make it, and its capabilities are nothing short of fantastic. But we can't expect to understand it thoroughly overnight and until we do strange things may continue to happen now and then."

And for every illustration of radar's capricious nature, such as the two above, radar operators will swap you hundreds like this one, incidents which collectively did much to swing the balance of war in our favor at a time when the enemy had the edge in superiority of numbers:

King George VI one night paid a visit to a Ground Controlled Interception station during the Battle of Britain. It was the first time His Majesty had visited any of the "most-secret" GCI stations, and the operators crossed their fingers and hoped the "gadget" would do them proud. They could scarcely have hoped for the dramatic demonstration that resulted. Thousands of feet above the heavily concealed, solid concrete room where controllers sat in front of the scopes, an RAF night fighter, "controlled" by the GCI, was attempting an interception with a Jerry raider.

Patiently the controller explained to H. M. the complicated workings of GCI radar, how enemy raiders were picked up and tracked at night, and how the Beaufighters were carefully vectored into position *behind* the foe. While he was talking, the controller kept his eyes on the two white dots on the PPI (Plan Position Indicator) scope that showed up every time the needle went round. One dot represented the enemy, the other the Beaufighter. As he saw the RAF plane being directed into position for the kill, he explained to the King, "Any moment now our pilot will begin to fire."

In a few seconds when the needle swung around the scope again, the controller knew the night fighter pilot had hit his target. Calmly he turned to King George and said in a very matter-of-fact voice: "If Your Majesty will kindly step outside the building, he will see the enemy raider coming down in flames."

The King stepped to the door and looked at the sky. The Nazi plane, enveloped in flames, was plummeting to the earth before his eyes. ☆

PICTURE CREDITS

28, 29: U. S. Navy Bureau of Aeronautics. 30: Piper Aircraft. 31: Aeronca, Republic Aviation, Luscombe, Stinson, Piper Aircraft. 51, 52: Sgt. Cecil L. Riley. 64, 65: Lockheed. 69, 70: Consolidated Aircraft.

All other illustrations secured through official Army Air Forces and Signal Corps sources. Requests for prints of photographs for official use and publication appearing in AIR FORCE should be directed to the AAF Photographic Library, Headquarters, AAF, Washington 25, D. C.

The Versatile B-29

Someone decides we need a big bomber capable of flying very long range and bombing from high altitudes, around 25,000 feet or more. So we get the B-29. Someone else decides we need to burn up Jap targets from altitudes of between 5,000 and 7,000 feet. So we use the B-29. Comes the invasion of Okinawa. It is decided that Jap fighter strips on Kyushu need to be neutralized. So the B-29s are ordered to do the job. And now B-29s up and make like fighters.

"Shrimper" was one of a force of B-29s attacking Usa Airfield, Kyushu. April 26th was a bad day with a complete undercast. "Shrimper," commanded by 1st Lt. Charles H. Lamback, dropped its bombs by instruments. Lieutenant Lamback was rather unhappy about not being able to see how much damage he and his squadron had done. So, instead of making a run for the coast, he looked for a hole in the clouds, found one, broke through to come out directly over the airfield. He made a preliminary run over the field while the crew located the bomb hits. They also saw six Bettys parked beside the strip. The gunners asked for permission to shoot at the Bettys, and Lieutenant Lamback could find no good reason for refusing their request. They made another run over the field, the gunners strafed, and two of the Bettys were seen to burst into flames. That seemed like pretty good results, so they continued their run, strafing dock area buildings and shipping. Thus "Shrimper" and its crew have the distinction of being the first Saipan-based B-29 to make a daylight, low level strafing attack on a Jap home airfield.

But it's something even newer in the life of a B-29 when it flies fighter cover for a Naval vessel. Two of them managed this unique tactic on the same mission.

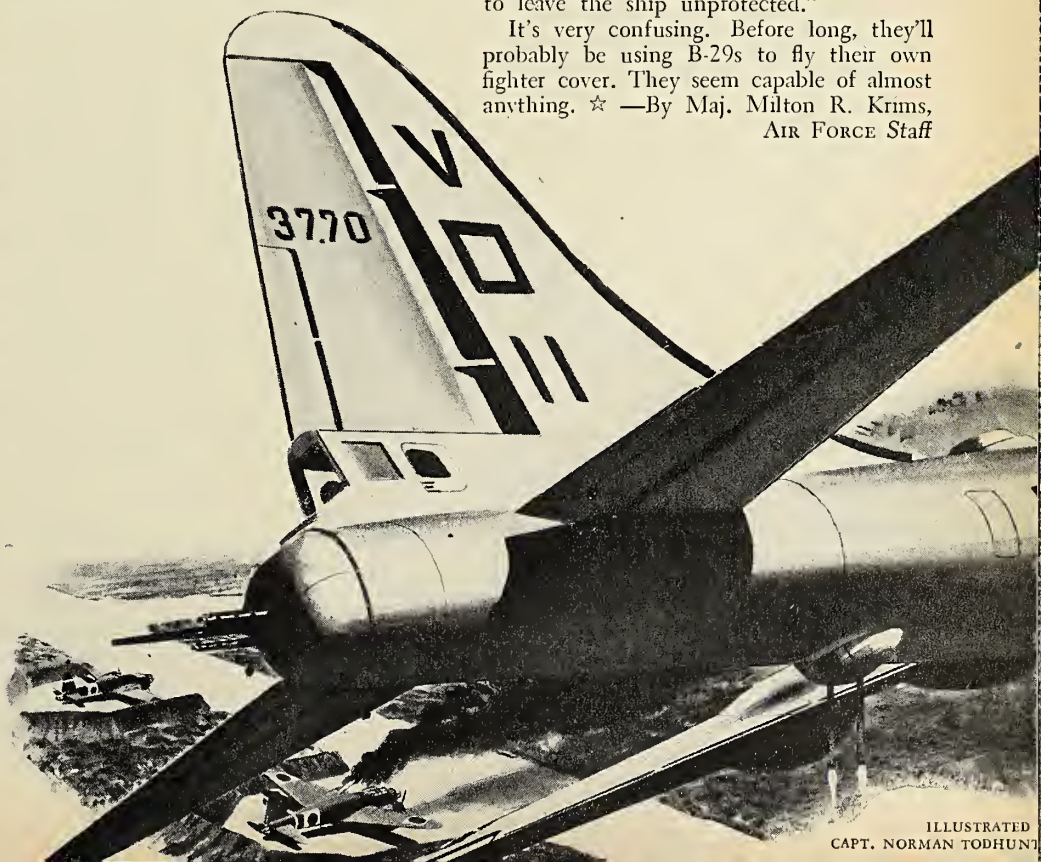
This particular day two B-29s, acting as Super-Dumbos, were flying their prescribed sectors. One was piloted by 1st Lt. John H. Buck, the other by 1st Lt. Alfred Stendahl. The B-29s were bombing Miyakanojo Airfield on Kyushu. The Super-Dumbos were flying air-sea rescue for this mission as well as searching for a crew that had ditched the previous day.

Lieutenant Stendahl's Super-Dumbo located some floating debris, then sighted an American survivor on a raft. Then they sighted several small Jap surface craft heading toward the floating debris. Lieutenant Stendahl put it very simply: "We strafed them from mast level and sank four." As an afterthought he added, "The others hurried back toward Japan."

At the same time Lieutenant Buck's B-29 was flying over a naval vessel, directing it toward a crew that had just ditched. Suddenly enemy fighters appeared. Lieutenant Buck squared off his B-29 to defend the naval vessel. "First," said Lieutenant Buck, "a lone Paul made an attack. We chased him, firing our forward guns. We ran him down so fast we had to make a 360° turn to avoid passing him. Then we went after him again and had to break off to prevent a collision. But our right gunner, Sgt. Louis Cutler, got him. He spouted smoke, then flames, finally crashed into the sea.

"We returned to the ship just as another Paul was coming in. We chased him, and when he saw us he left. We didn't want to follow him too far because we didn't want to leave the ship unprotected."

It's very confusing. Before long, they'll probably be using B-29s to fly their own fighter cover. They seem capable of almost anything. ☆ —By Maj. Milton R. Krims, AIR FORCE *Staff*



ILLUSTRATED
CAPT. NORMAN TODHUNT

Sgt. Bill Jones was in the Air Corps when most of the AAF's present members were still in grade school. He was already in the Philippines when war clouds were gathering in the Far Eastern sky. What happened to him there—and many like him—has already been seared into the mind and heart of America. Taken prisoner when Bataan fell, he endured the savage torture of the infamous "Death March" only to die later in prison camp of malnutrition and disease.

When he died, Bill Jones was 39. Back home he left his wife, Sarah, and four children. Two of them, both with brilliant records in school, are ready for college or vocational school. The sooner they finish their training, the sooner can they earn their own living and ease the financial burden on the family. But a widowed mother's budget can make no provisions for the tuition fees this will require. Sarah shakes her head, wishes there were some way she could give her children the education they need.

There is, Mrs. Jones. This is it:

You have not been forgotten. There are hundreds of Bill Joneses, hundreds of AAF men who have died in enemy prison camps. Many of them left behind sons and daughters who are, or soon will be, in need of financial assistance to help them complete their schooling.

For more than a year now a group of women volunteers, all of them wives, mothers, sisters or daughters of AAF men, have been quietly making plans to take care of these cases. To date, the Scholarship Fund of the National Association of Air Forces Women has in it, as a modest beginning, $17,000 to be put to immediate use as loans and scholarships for those eligible to receive it.

Unfortunately the record of deceased prisoners of war, particularly those who have died in Japanese prison camps, is incomplete. As a result the NAAFW is unable, in many cases, to communicate with the very persons for whom the fund was set up. Mrs. Henry H. Arnold, president of the association, reports that the NAAFW is anxious to get in touch with the widows of men who have died in enemy prisons and who have children eligible and in need of help from the scholarship fund. These individuals are urged to write to the National Association of Air Forces Women, 1702 K Street, NW, Washington 6, D. C.

Scholarship funds have been raised by private donation, contributions from servicemen, and by a portion of the profit made from the sale of NAAFW members' silver wings. Mrs. Howard C. Davidson heads the committee in charge of the project and is assisted by Maj. Gen. Frederick Anderson, Col. Corrin L. Strong, Lt. Col. Carl McClure, Maj. Edward A. Bradunas, Mrs. Oliver P. Echols, Mrs. Arthur W. Vanaman, Mrs. Lawrence Kuter and Mrs. William Crom.

"Eventually, as the organization's funds expand, it is hoped to broaden the scope of this scholarship program to provide assistance to many more hundreds of families of air force men killed in battle," Mrs. Arnold said recently. "But for the moment we must limit it to the children of those who died as prisoners of war."

At the present time, the scholarship program constitutes but one of many welfare projects being carried out by the NAAFW. Members of the organization, all working on a volunteer basis at every airbase in the U. S., have set up housing committees in crowded cities and towns adjacent to AAF stations, supervised day nurseries, worked in post hospitals, contributed thousands of hours to the Red Cross, worked as volunteer chauffeurs, receptionists, librarians, waitresses and cooks, assisted post chaplains and Personal Affairs officers, and taught classes for the AAF's Convalescent Services Program—just to name a few activities.

Since its organization on February 8, 1944, more than 40,000 air force women have asked to be enrolled as members-at-large in the association; still another 35,000 are actively affiliated with the NAAFW as members of AAF Women's Clubs throughout the U. S. More than 22,000 wear the official wings of the group.

All profits made on the sale of these pins are used to carry out the work of the organization. Cost of the wings is $1.80, including federal tax; to be eligible to wear them, an individual must first be a member-at-large of the association, annual dues for which are $1.00. An AAF officer or enlisted man wishing to enroll a woman relative in the NAAFW must therefore enclose with the application a total of $2.80 together with his grade, unit and serial number as well as the relationship and address of the person for whom he is taking the membership. ☆

GUERRILLA LIGHTNING

(Continued from Page 9)

city. Almost like magic 1,000 Volunteer Guards materialized and the trek was started. Most of the way there had been no road, but the guards had built one. In some places there was too much mountain. The guards harnessed jeep and trailer with ropes, bodily hoisted them up the side of cliffs and lowered them down mud-slithering walls.

They made the trip in the almost incredible time of 30 hours. Behind was a barbed wire telephone line of 35 miles.

Aerial pummeling of Cebu installations began at once. Indicating a healthy respect for American bombing, the Japs disposed troops around unlikely targets, like Guadalupe church. Their stores were in tunnels and caves. The controller called for 1,000-pound GP and jellied fire bombs.

Installations were burned and mauled, then the target shifted to dispositions facing guerrilla lines.

For the safety of the guerrillas, ground markers came into play. Panel sheets were laid out to designate both friendly positions and the Nips. When the Nips imitated the panels to confuse the pilots, the guerrillas outfoxed them with a variety of symbols.

As an added precaution to assure precision bombing, the controller often had pilots drop one test bomb. With any corrections necessary, the next run delivered the works.

At times, close work in strafing was controlled by a guerrilla observer in a P-61 Black Widow. It worked well. The Lightnings or Corsairs would tack on behind the Black Widow and head on the target.

By March 12 the Japanese command had apparently decided something must be done about the accuracy of the fighter-bombers. One way was to choke off Tuburan strip—both a supply funnel and emergency landing-field—and maybe corral the support team in the hills. The move to Tuburan would also relieve pressure on Cebu City.

A message reached air support team from Colonel Cushing:

"Proceed at once to Taburan strip; 1,500 Japs with 500 reserves are attacking."

When the team arrived, the Japs were four miles away and the field was socked in. Leyte had planes, but it, too, was weathered in. On the field were two F4Us which had flown dusk patrol the night before and set down at Tuburan on bad weather reports from Leyte. The pilot's decision to stay over was influenced somewhat by the prospect of a guerrilla-cooked chicken and steak.

With a ceiling under 1,000 feet, their airplanes rearmed with ammunition from crash-landed planes, they made one pass on the Jap lines. That was that—they had no more starting cartridges to get up again.

The Nips had been scattered, but they were re-forming for another assault. Even the guerrilla regimental commander—outnumbered and outgunned—was ready to admit the strip was doomed.

Suddenly two lone P-38s of the Jungle Air Force Ringmaster Group winged over, heading home after a cover mission.

Hopefully, controller contacted them.

"Have you gas and ammunition enough

to handle an emergency mission for us?"

"Roger!"

Orbiting the battleline, the pilots were briefed on the most difficult target there is —a zig-zag line, something like this:

"See that bridge and tall tree beside it?"

"Bridge—tall tree—Roger."

"From there to the schoolhouse. See?"

"Schoolhouse. Roger."

"Then to where the third creek empties into the river."

"Roger."

"Now back to a point crossing the road at the bridge by the crossroads."

Finally the jigsaw was traced. The steeplechase was on. On the second pass, a pilot's jubilant voice came in.

"Hey! There's a whole mob of guys running down the road headed north."

The controller: "It can only be Japs—go get 'em!"

The pilot, a moment later: "Whoopie! Lookit 'em go."

When the pilots came back, one called, "I'm on my return run and they're still lying all over the road."

Those two pilots saved the strip. What was left of 2,000 Japs were scattered so badly the guerrillas took a two-day rest.

From then on, there was no peace for the Nips; they were herded by fighter planes and heel-sniping guerrillas.

On March 21, Guerrilla Team No. 1 received its final communication from headquarters:

"Have your team at Tuburan 0830, 23 March, to be lifted up this headquarters."

There was no doubt of the mission's success, despite being one of the first of its kind, in the face of adverse weather and terrain and against a better-armed, numerically stronger ground force.

Reasons boiled down to radio equipment which was operational the entire 37 days, guerrilla liaison which was fast and accurate on vital targets, and pilot savvy.

On the morning of March 25, units of the 8th Army's American Division stormed the beaches south of Cebu City. Within 48 hours of bitter fighting, the Division had taken the capital. ☆

Answers to Quiz on Page 62

1. (D) 10 years and 2 months
2. (D) jet propulsion engines
3. (B) B-29 photographic plane
4. (B) 225,000
5. (C) 10
6. (A) bridges
7. (D) 300,000,000 miles
8. (A) Oscar Mark II
9. (C) 18
10. (D) Raised upward, with hands grasping risers
11. (B) 10 pereent
12. (B) B-24
13. (C) 120,000 lbs.
14. (B) false
15. (B) 1,000 feet
16. (D) Staying airborne for six days
17. (B) $50
18. (A) Maj. Frederick A. Borsodi
19. (B) 30,000
20. B-24 (Recaptured in Salsburg, Austria)

FLOATING DEATH

(Continued from Page 6)

Navy's request, hit the Tachiarai and Oita airfields and the Omura Aircraft Factory, all on Kyushu.

Photo reconnaissance indicated almost immediate results. All shipping through Shimonoseki had stopped; other shipping in the western part of the Inland Sea seemed to be frozen. As so often before, the enemy had been surprised. He could be expected to take immediate countermeasures, but he wasn't given much opportunity. Again in late March B-29s of the 313th Wing mined Shimonoseki and Hiroshima and added Kure and Sasebo. These missions were the largest aerial mining operations ever attempted.

When American forces landed on Okinawa, April 1, Kure was again mined. Photo reconnaissance showed one Jap fleet had moved to several different positions, evidently in an unsuccessful hunt for a passageway through the minefields. So far, no naval vessels had gotten out of the Inland Sea to engage our forces operating against Okinawa.

Mining operations continued during early April. Despite frantic attempts by Japanese minesweepers Shimonoseki was impassable and most of the Japanese fleet units at Kure and Hiroshima were unable to get by the surrounding minefields. The only way out was through Bungo Suido.

Finally, the 42,000-ton Yamato, accompanied by six smaller craft, proceeded toward Okinawa in an evident attempt to interfere with our operations. A B-29 of the 73rd Wing flying a routine weather mission and commanded by Lt. J. W. Rawlings, Jr., sighted the Yamato and its escort. Shortly thereafter, aircraft of Task Force 58 sank the Yamato, biggest, newest and last of its class before it ever got within sight of Okinawa. Neither Captain Grossman nor Commander Johnson claims mining sunk the Yamato; they state simply that the mining operations made it impossible for the Yamato, whatever its intentions, to leave the Inland Sea by any way other than Bungo Suido.

The Japanese increased their minesweeping. When usual tactics failed, they sent out suicide squadrons composed of small boats approximately 50 to 75 feet long, evidently designed to explode the mines on contact. Even then results for the Japanese were most unsatisfactory.

The Okinawa campaign support revised the order of precedent but not the overall mining plan. The mining operations blockaded shipping to and inside Japanese home waters yet they were essentially tactical and intended to support the Okinawa operations. However, they were an integral part of the strategic scheme and supplemented the strategic bombings of Japan by the B-29s. They blended into the next phase of the mining plan which was designed to assist in the destruction of Japanese productive power, both military and civilian, by completely paralyzing Japanese shipborne commerce between its industrial cities. This second phase began in mid-April with the mining of the entire Inland Sea area, plus Tokyo and Nagoya. Within three weeks mining had seriously injured the supply lines between the individual cities of Japan bordering on or connected by railroad with the Inland Sea ports. No merchant shipping was seen in the Shimonoseki Strait, very little was moving in the interior, very little in the exterior. The Japanese radio publicized a warning that passage of evacuees from the burned out areas could not be accomplished for an indefinite period due to the closing of the Strait. It was estimated that of 650,000 tons of raw materials and food bound for the Empire during the first 20 days of the mining operations over 500,000 tons were prevented from being delivered. And during this time, Japan's great industrial cities were being hit by incendiary attacks that burned up stockpiles and factories as well as great food centers. Losses in food imports alone must have added tremendously to Japan's myriad problems. The only solution was to divert shipping to the northern Honshu ports.

Now the B-29s really reached out. Starting in the last weeks of May they mined Tsuruga, Miyazu, Maizuru, and even Niigata in the longest mission ever flown over the Japanese homeland by a B-29. The Japanese were forced to suspend movement of ships to these ports. They made frantic but futile attempts to sweep the mines infesting their waters. Finally, in desperation, they sent their ships through anyhow, absorbing their losses in an almost suicidal attempt to obtain badly needed supplies.

Then began the third phase, the all inclusive job of throwing a ring of mines around the home islands of Japan—a job that is certain to help immeasurably in bringing the Pacific war to a faster close. Meanwhile, the great B-29 attacks on Japan's cities were growing daily. The Japanese were finding it increasingly impossible to raise and distribute enough food to sustain the population. And food imports were dropping all the time because of the minefields planted by the B-29s in Japan's harbors and shipping lanes. Yet much of Japan's shipping will continue to be sacrificed to feed iron, coal and other necessities to her war machine. It is not unreasonable to assume that if the government's present policy persists there will not be enough shipping left to feed the people of Japan even after peace has been restored. The people of Japan face not only defeat but starvation.

On April 7, the 21st Bomber Command received the following message from Admiral Nimitz: "The Navy is gratified at being able on Army Day to congratulate the 21st Bomber Command on its outstanding achievement in completing the very effective mining operations reported yesterday. This project, like all your operations to date, has been executed with precision and determination which arouses our admiration. It is a definite contribution toward winning the war."

Commander Johnson, Captain Grossman and all the other mining enthusiasts with them are particularly happy about that last sentence. They believed for a long time that mining would be exactly that. It was gratifying to have their faith justified. ☆

SHOOTING THE BREEZE

Got any good stories?
Send 'em in!

Southwest Pacific. Two correspondents for AIR FORCE had just strolled out of a mess hall at an island airbase when they noticed a comely native girl coming up the road. She came on gracefully, looking neither to the right nor the left. As she passed, one correspondent clutched the other for support and they both gave the girl a second

take. Her button-down-the-front dress was securely fastened by eight Good Conduct Ribbons.

China. An ATC pilot reported the following telephone conversation with the weather office at an advanced fighter base where he landed recently:

"Hello," the pilot said, "will you give me the winds aloft?"

"Who is calling?" the weatherman asked.

The pilot identified himself.

"Oh, good!" the weatherman exclaimed. "When did you land?"

"About 30 minutes ago."

"What did you find the winds aloft?"

"Oh, about 260 degrees at 30," the pilot answered impatiently.

"Well, thank you very much," said the weatherman and hung up.

U. S. A.—Fortunate is the airman who has escaped the sodden wit who says morbidly, "If this parachute fails to open—bring it back." Lt. Ralph L. Watts, trainee pilot at Bartow, Fla., had an experience which finally matched the advice. Forced to abandon his P-51 when fire developed in the cockpit, Watts jettisoned his canopy. The next moment the pilot was struck by some unidentified object and knocked unconscious. When his mind cleared he found himself floating through space and safely to the ground, his parachute functioning perfectly. Inspection of the chute revealed that the ripcord handle had not been pulled and that the packer's seal on the bottom of the chute was still intact.

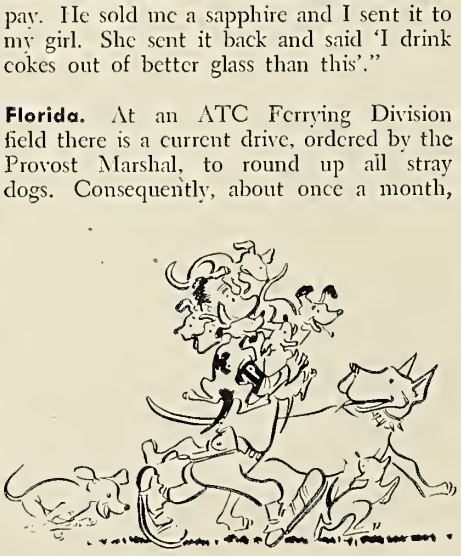
India. American soldiers in this region have not impressed the natives as being the sharpest traders in the world. Yankee cleverness has not always been apparent when the GI deals on a business basis with jewel wallahs.

Recently an AAF mechanic was buying such a bauble from a jewel wallah. He had been assured that his rupees were being spent for a rare gem, worth a hundred times the purchase price.

The mechanic was reaching for his billfold when the salesman, who obviously couldn't read English, made the mistake of proudly exhibiting a chit (letter of recommendation) from his last customer. It read:

"To Whom It May Concern, Beware! This thief took me over for half a month's pay. He sold me a sapphire and I sent it to my girl. She sent it back and said 'I drink cokes out of better glass than this'."

Florida. At an ATC Ferrying Division field there is a current drive, ordered by the Provost Marshal, to round up all stray dogs. Consequently, about once a month,



the MPs shift their attention from rolled-up sleeves to GI pups without dog tags. At such times, however, the catch is always small. The dogs seem to know when the heat is on, and by the same instinct they reappear when the search is over.

The other day, the sergeant of the guard screamed his jeep to a stop in front of the consolidated mess and jumped out, ready to sweep up a load of dogs. But there was not a pup in sight.

"All right, you jokers," the sergeant demanded irritably. "Who's been tipping them off?"

Germany. The commanding officer of the 9th Air Disarmament Group at Nellingen, near Stuttgart, had asked his sergeant to put through a telephone call. A short time later the sergeant reported that he had

been unable to reach the desired station.

"How did the operator route the call?" the CO asked.

"The usual way," said the sergeant, "Blockbuster to Thunder to Growl to Murmur to Whisper."

"Well, try once more," the officer said.

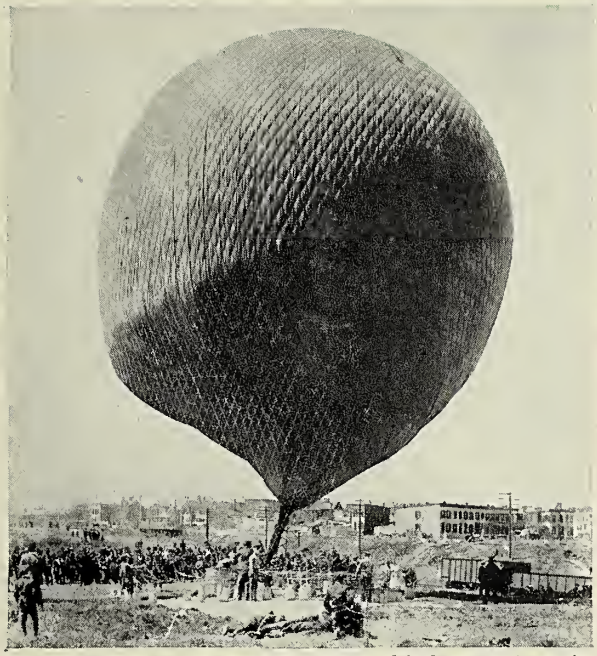
After another half hour the sergeant reported failure again.

"We can get Blockbuster to Thunder to Growl to Murmur to Whisper," the boy said, "but we can't hear Silence at all."

India. At one station here the accent has been upon good housekeeping. Everything is kept in order. A cigarette in the street is considered profane. Order and cleanliness reign. In order to get along, put trash in the trash can, ashes in the ash can, garbage in the garbage can—and don't touch the fire buckets which are neatly labeled: For Fire Only.

The only disruption of this idyllic state occurred recently when a native civilian took the "For Fire Only" sign too literally. The man poured out the water and dumped in some trash. It was burning merrily when discovered. ☆

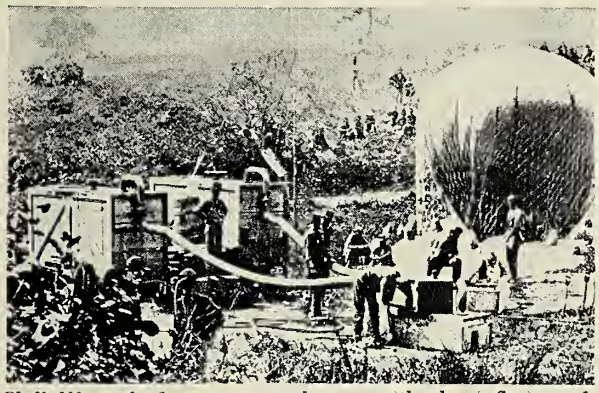
The Album — LIGHTER-THAN-AIR



The Signal Corps balloon boys got this bag up into the blue with compliments of the Washington, D. C., Gas Co.

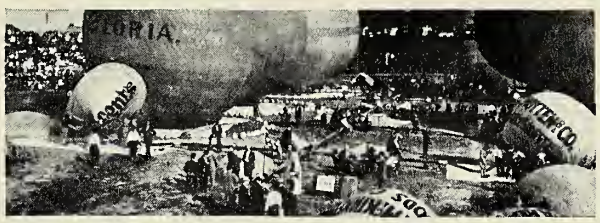
Here's Charley Jones who got this soggy football off the ground with the help of a Curtiss engine at his back.

Baldwin's airship, the "Signal Corps No. 1," is shown during a test over Fort Myer, after its purchase by the Army.

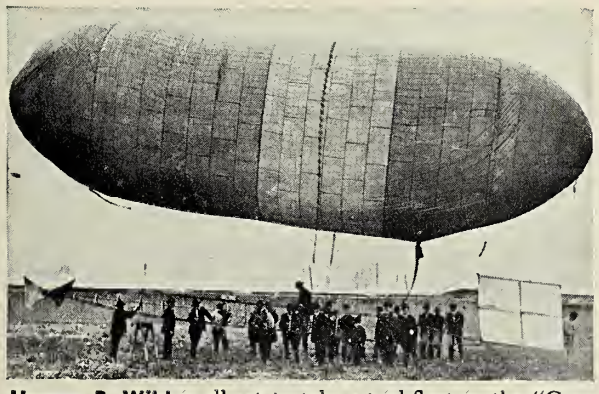


Civil War air force gets underway with the inflation of the balloon "Intrepid" during the battle of Fair Oaks.

Whoever met Looie got a front seat at this Gordon Bennett International Race, held in St. Louis on October 21, 1907.

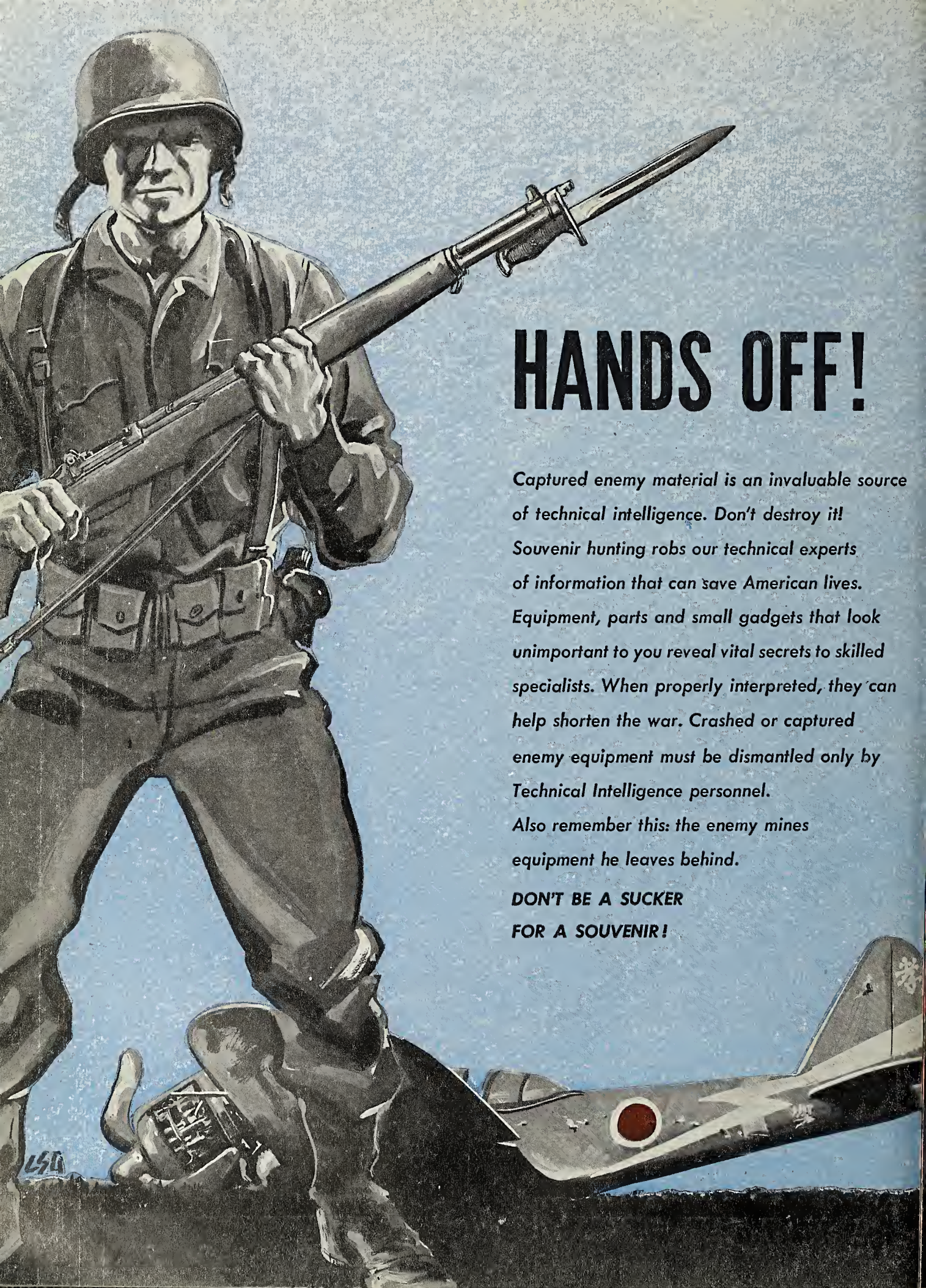


The Peoria balloon was really cooking with gas when it won this well-sponsored race at Peoria on August 18, 1909.



Horace B. Wild is all set to take a trial float in the "Coey Flyer," which looks like it needs a good dab of mustard.

Army's C-2 comes to rest at Crissy Field, San Francisco, after completing flight from Langley Field in 1922.



HANDS OFF!

Captured enemy material is an invaluable source of technical intelligence. Don't destroy it! Souvenir hunting robs our technical experts of information that can save American lives. Equipment, parts and small gadgets that look unimportant to you reveal vital secrets to skilled specialists. When properly interpreted, they can help shorten the war. Crashed or captured enemy equipment must be dismantled only by Technical Intelligence personnel.

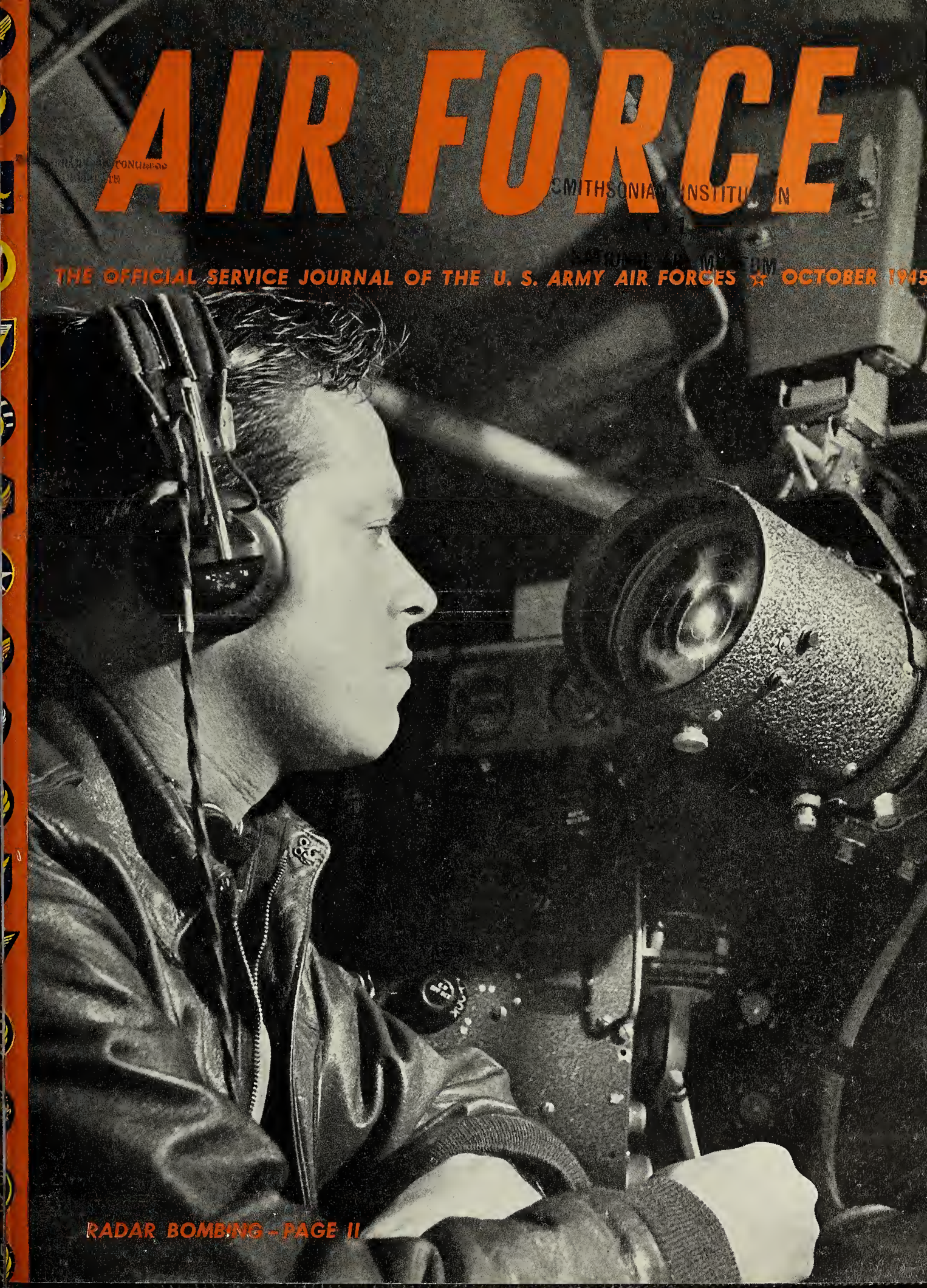
Also remember this: the enemy mines equipment he leaves behind.

DON'T BE A SUCKER
FOR A SOUVENIR!

AIR FORCE

SMITHSONIAN INSTITUTION
NATIONAL AIR MUSEUM

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES ☆ OCTOBER 1945

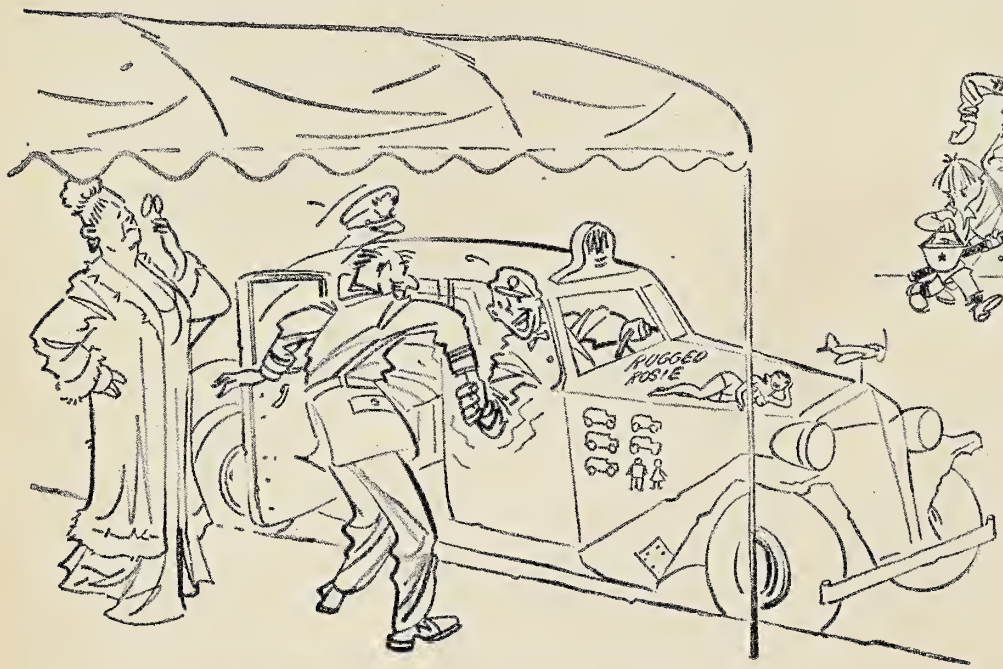


RADAR BOMBING – PAGE 11

Honorable Discharge

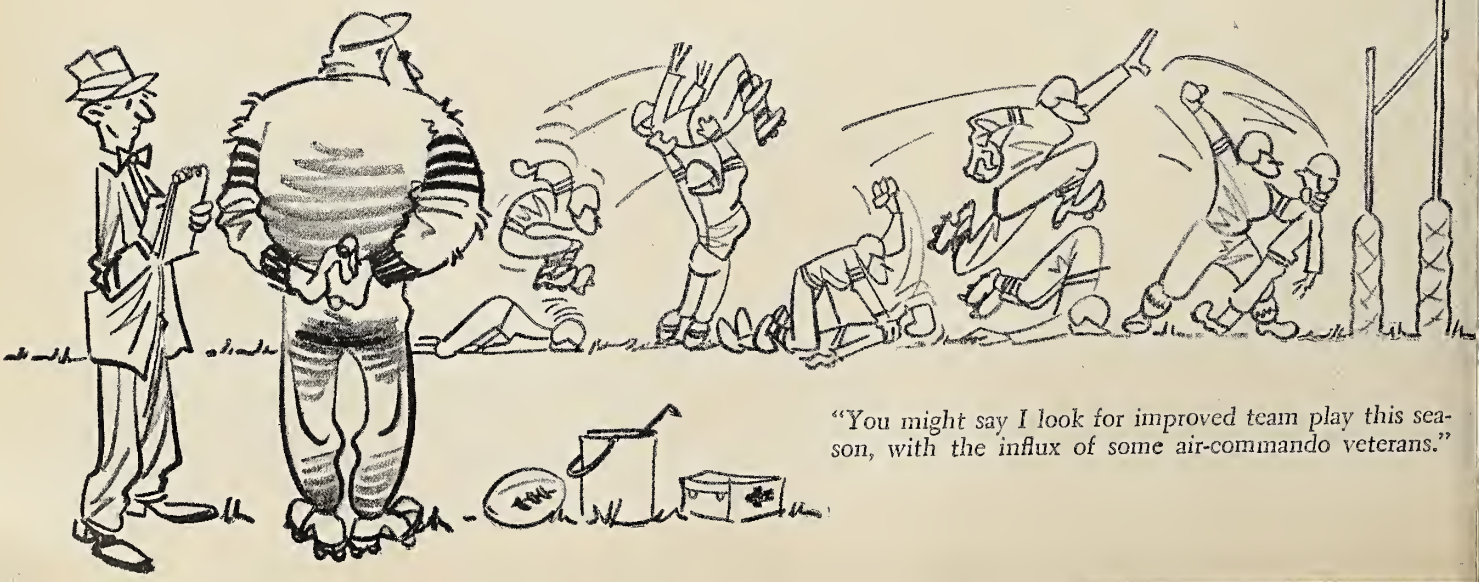
BY CAPT. WM. T. LENT
AIR FORCE Staff

"Why yes, his record seemed to be in order."



"Well, well, if it ain't old Ironpants."

"I'll bet your mother will be surprised when she sees what I brought her."



"You might say I look for improved team play this season, with the influx of some air-commando veterans."

Rendezvous

High-Speed Strafing

Dear Editor:

In reading your article "Shock Waves at 600 MPH" in the February issue of AIR FORCE I was reminded of several combat experiences which members of my squadron have had with high-speed dives.

I was the commanding officer of the 528th Fighter Squadron stationed at Tinghawk Sakan, Burma, during the Myitkyina Campaign. We flew A-36s, and P-51As and Bs. Most of our work was air coordination. AA encountered was normally small caliber ground fire. Occasionally we would meet 40 or 20 mm AA. Nearly always this was on field "beat ups."

We had a minimum strafing speed of 350 mph on air coordination targets. Of course this was not always obtained, but during every briefing the pilots were reminded to keep above this minimum. All planes hit by AA while strafing were, to my knowledge, flying slower than 350 mph.

When going on a beat up of an enemy airfield where the AA was either unknown or known to be heavy, we briefed to come in at least 15,000 feet above the ground and spiral down steeply (not split ess) in a 180-degree turn to strafe our targets. At about 30 miles from the target we would start a shallow dive from 20,000 or 25,000 feet increasing our throttle and RPM settings to maximum cruise. The formation was echeloned to the inside of the turn we planned to make over the field. When within AA range we started our turn and steep spiral, straightening out to strafe approximately 2,000 yards from the target. At the start of this spiral we usually indicated 350 to 400 mph and picked up another 100 mph when we dropped our plane's noses in the spiral. Normally we indicated 500 plus in our strafing pass.

The squadron SOP for this maneuver was to keep the left hand working the trim tabs enough to keep the stick pressure light, with only slight tail heavy pressure during the latter part of the spiral. At the start of the mission we turned on our cockpit defrosters to prevent canopy fog.

In the spiral the planes had a tendency to yaw from side to side. We believed this was the gas in the fuselage tank which was building up on the side of the tank due to inaccurate trimming—at least that was the explanation we gave ourselves. There never was any difficulty in recovering on the deck from the dive.

One such trip found four of us in P-51Bs over Mandalay at 26,000 feet indicated. We looked over the field at Anisakan, meanwhile circling to 23,000 feet. We then headed west in a steep dive turning slightly to the south. At about 8,000 feet we had completed a 90-degree turn and were indicating 500 mph. We increased our rate of turn until we headed toward the field. I had been playing my throttle but now put it at maximum cruise. At this time I was indicating 550 mph. The four of us were approximately abreast but the Number 3

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Vol. 28 No. 10 October 1945

AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

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man passed me as we recovered on the deck. Later he said he was indicating 600 mph.

No buffetting was felt on this mission; however, this may be partially explained by the fact that we had removed the bomb racks.

Another mission over Lashio airport was an experimental high altitude dive bombing run. We peeled off at about 18,000 feet. At approximately 10,000 feet I released my bombs and started a recovery at 500 mph indicated. I found it necessary to yell and strain my stomach in order to prevent "blacking out." I also found the plane pitching up and down. With very little back pressure it would create a sharp increase in positive Gs. When I relaxed on the back pressure, the plane would create a slight negative G. Several other pilots noticed this. We attribute this to the burbling over the wings caused by the arms for the installation of Rocket Launcher M-10 fastened to the wings. . . .

While the AA fire was not heavy around most of our targets in Burma, we did lose planes by ground fire. On all of our missions over airfields and other targets comparatively heavily defended by AA, we never had a plane punctured by an enemy bullet when we used our high-speed technique. The squadron later moved to China where I left it. However, I have learned that the same tactics were employed there against heavy AA with comparable results.

Lt. Col. John C. Habecker,
Headquarters, AAF.

Added Credit

Dear Editor:

I like your magazine but I want to protest an article in the June, 1945 issue—"Drop on Corregidor." You gave credit to the 3rd Attack Group, or Grim Reapers, as the A-20s who covered the landing of paratroopers and bombed the rock. I believe if you'll check the records more closely you'll find that the A-20s on that list of operations were the 417th Bomb Group Sky Lancers. My information should be correct. I'm a member of the Sky Lancers.

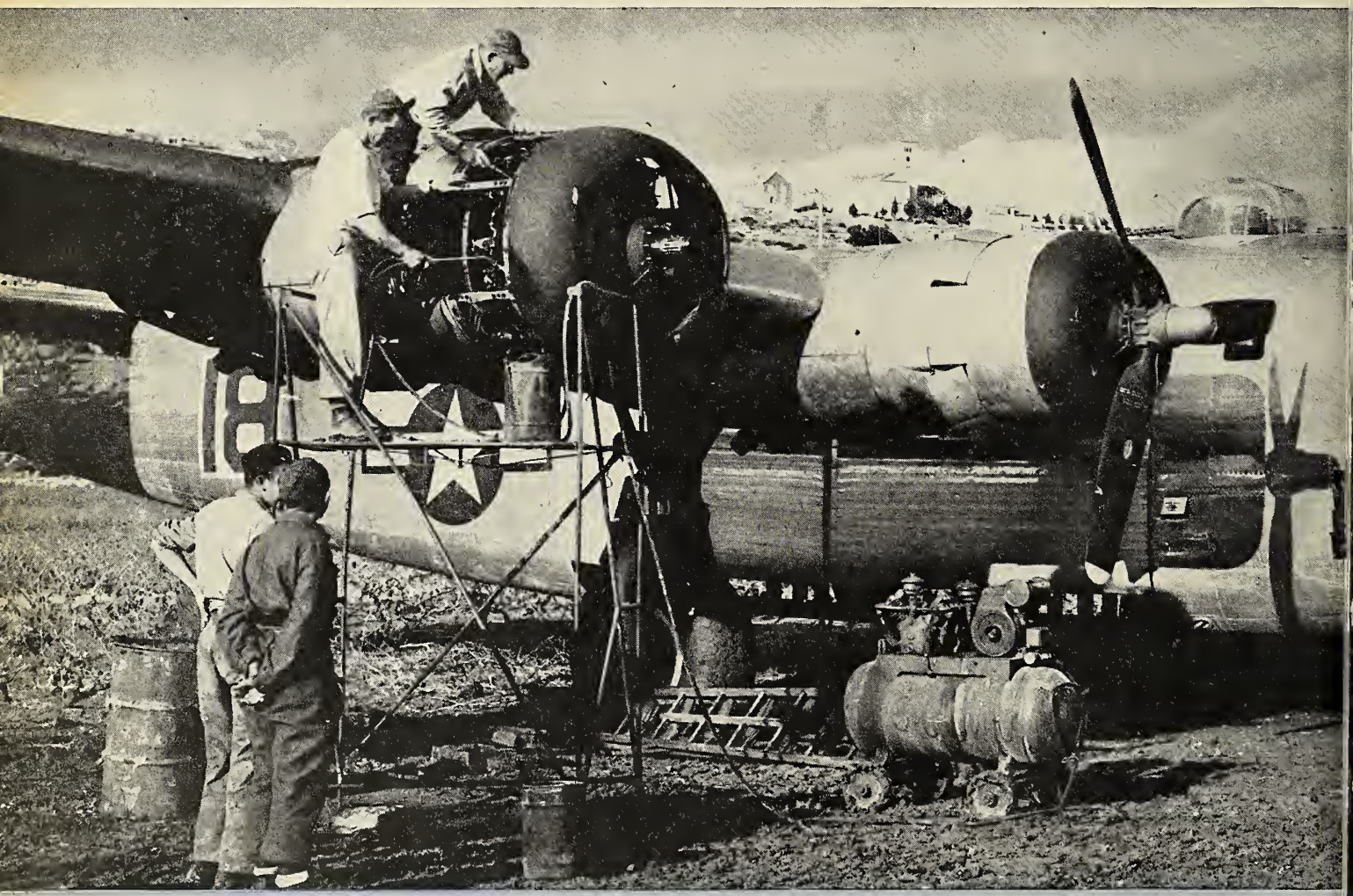
S/Sgt. Ben Butler,
Philippine Islands.

The records show that, in addition to the 3rd Attack Group, the 417th and the 312th bomb groups were in on this job with their A-20s.—Ed.

Slow Trigger

Dear Editor:

For a perfect illustration of how NOT to handle a .45, commend me to the back cover of your July issue. Why does your model have to use two hands, and why isn't he cocking the gun? A pistol should be carried with the barrel loaded and the ham-



How Sharp are YOU?

No hardstand for this 15th Air Force bomber on a Dalmatian island, but plenty of good detail in the photo to test your mental mirror. Look at the picture for a full 60 seconds, remembering as many details as you can, then turn to Page 43 for a list of 10 questions. With 10 for each correct answer, a score of 70 is fair, 80 good, 90 excellent, 100 sharp as a tack.

HOW SHARP ARE YOU? . . . . . Turn to Page 43

mer down, taking advantage of the built-in safety design of the firing pin. When in the field in 1918, I used to be able to drop a handkerchief from shoulder height with my left hand, draw from a closed holster and fire two shots before it touched the ground. . . .

Capt. Richard Douglas,
Army Service Forces.

Our ordnance informant tells us that, when the thong is not used, it is necessary to hold the holster when drawing—and that removal of the thong is common practice for all but mounted troops to avoid restriction of blood circulation in the leg. He agrees, however, that the model should be cocking the pistol. In this he and we stand corrected.—Ed.

A Record?

Dear Editor:

In the matter of unit awards, the 316th Troop Carrier Group has been fortunate enough to receive three Distinguished Unit Citations and nine campaign stars for service in the ETO.

I am frequently asked by our personnel how that record stacks up with other AAF units. It will be very much appreciated if you can help us determine any units which have equalled or surpassed our record.

Maj. Andrew J. Milstead,
Pope Field, Ft. Bragg, N. C.

Anybody top this?—Ed.

Hats Off Department

Dear Editor:

Your story in the August issue, "Blanket of Fire" by Col. Roy R. Brischetto, 5th Fighter Command, is very timely and interesting. However, why not allow just one paragraph to those in the minority who have been so helpful to the AAF in its incendiary missions in both the ETO and Pacific, the men who mix the jell and fill the fire bombs, the boys of the Chemical Warfare Service?

Capt. Francis T. Boyle,
Westover Field, Mass.

Dear Editor:

Someone—and I guess it will have to be me—should recommend your investigation of a thing called MATS, Mediterranean Air Transport Service. It didn't drop any atomic bombs or offer airline hostess service, but it took an ill-assorted lot of people and airplanes and did a terrific job in the Mediterranean when the job needed badly to be done.

MATS never bothered with public relations, unfortunately, and its story has been overshadowed by all the great events to which it contributed.

Time after time, Air Transport Command has been given credit for work done in the Mediterranean Theater by MATS—for the inauguration of Mediterranean air routes, for the "blood run" to the Anzio beachhead, for the air priorities setup. I'm proud of the Army's Air Transport Command, too, as every American should be, but because I was one of the MATS's orphans, I'm a little jealous of its publicity.

MATS pioneered North African, Sicilian and Italian transport routes and did it with

(Continued on Page 36)

In This Issue

Looking into the PPI scope aboard a B-29 in this month's front cover is Capt. John C. Mays, a radar-navigation specialist, whose experience with radar sets dates back to 1942 in the days of the defensive strikes by the 19th Bombardment Group from Australia. Captain Mays had been a navigator with the 435th Squadron when the B-17 outfit was shoved out of Java by the onrushing Japs. Then from Australia, and later from Port Moresby, Captain Mays' outfit began flying sea-search missions using the first ASV (Air-to-Surface Vessel) radar sets in the Southwest Pacific theater.

Training in the use of the sets was strictly on-the-job business. A few enlisted men who had accompanied the equipment from the States installed the sets in the planes and showed the navigators on the airstrip how to operate them. The finer points of using the equipment had to be picked up by the navigators in flight. ASV-equipped B-17s would go out on long search missions and, as soon as an enemy convoy was spotted, they would send back reports to guide other 17s with bombs to the prospective target.

After his return to the States, Captain Mays lectured on navigation in the 2nd Air Force, attended AAF Radar School at Boca Raton, Fla., and began a tour of duty in the Radiation Laboratories at Massachusetts Institute of Technology where he has continued to work on experimental radar bombing and navigation. (See "Radar Bombing," Page 11.) In January of this year, Captain Mays flew to South America with some experimental high resolution radar equipment to run tests to determine its reaction to atmosphere with high moisture content. The cover photo was taken by T/Sgt. Roger Coster, AIR FORCE staff photographer.

☆

When it became apparent that the Japs were on the verge of folding, we alerted our overseas staff members to rush us notes on the reaction of AAF men in their theaters to the end of the war—when it came. Well, the day—and the reaction—came rather spasmodically. Lt. Col. James H. Straubel, editor of AIR FORCE, who was on Okinawa at the time, cabled that his sector went wild on receipt of the first word that the Japs had offered to surrender. That was August 10. It was the same at Guam and in Chungking. At Far East Air Forces headquarters in Manila, however, the boys didn't start their big noise until more than 24 hours later, when Washington announced conditional acceptance of the Jap surrender offer, according to Maj. Ben Grant, officer-in-charge of our Far East Branch. From Europe, Capt. Tom Siler reported that most of the AAF personnel in Paris and London waited until the formal surrender announcement on August 14 (Washington time) before really cutting loose. The same was true of New York and Washington and San Francisco and intermediate points in the States. As these reports from all over the world reached our home office in New York, they were put together by Capt. John C. Jay, and the net result, "This Was It," begins on Page 4.

☆

One of the many candid cameramen who swarmed around the airfield on Ie Shima August 19, snapping pictures of the glum Japanese emissaries on their way to Manila to discuss surrender terms, was Sgt. Norman L. Pratt of the 4th Aireraft Maintenance Unit (Floating), several of whose snapshots appear on Page 44. A set of Sergeant Pratt's Ie Shima photos was forwarded by plane to AIR FORCE by his CO, Capt. Kenneth F. Knox.

☆

Although "Long Legs," Page 16, was written by Maj. Milton R. Krims of the AIR FORCE Overseas Staff several weeks before the Jap surrender, it tells of a job by men and planes that will live in memories and histories of the Pacific air war long after much of the spectacular detail of the moment is forgotten. It is a story of the long-range fighters, the pilots who flew those monotonous, over-water missions of 16 or more hours' duration to perform a much-needed escort job or shoot up vital targets not suited for the bombers. For much research and material furnished for the article, Major Krims and AIR FORCE are indebted to Capt. Bob Wistrand of 5th Fighter Command and S/Sgt. Barney Sauve of 13th Fighter Command. Our thanks, too, to Maj. Gen. Paul B. Wurtsmith, commanding general of the 13th Air Force; Brig. Gen. Frederick H. Smith, Jr., commanding general of the 5th Fighter Command, and Lt. Col. J. A. Johnson of A-3, headquarters, Far East Air Forces, for their advice and assistance in the preparation of the article. ☆

NEW ADDRESS

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Telephone: HAnover 2-5200 **Teletype: NY-1-2782**

THIS

On Okinawa there was shooting; in Paris there was dancing in the streets. Around the world the celebration varied but to AAF men everywhere news of the Japanese surrender meant the glorious climax of a job well done

WAS IT

By Air Force Overseas Staff Correspondents

The red alert sounded on Okinawa Shima at approximately 2200 hours on August 10—the same wailing call that had been warning AAF men to hit the dirt all along the line for more than three and a half years, from Moresby and Saipan to Dutch Harbor and Hengyang and Leyte.

But this time the big searchlights were dark and the heavy ack-ack guns failed to pound out their usual welcome. Only the smaller guns were firing, and their crackle sounded like a Fourth of July gone mad. The night sky was alive with bright orange tracer streaks and star shell flares and puffs of light flak.

No enemy aircraft were over Okinawa on this night. The enemy was washed up—beaten before the final round. The radio had announced the Japs' offer to surrender, and while it wasn't official yet, the suddenness of the announcement had touched off a wild celebration that had the whole island in an uproar. Officers and EMs fired .45s and carbines into the sky. AA men pressed the triggers of their 40-mms and held them until the gun barrels were red hot. It was mad hilarity that took the lives of six men and wounded at least 30 before it ended.

But the celebration was premature. Radio announcements had clearly stated that the war was not yet over, and that the Jap surrender proposals had a string attached to them. Yet to the men on Okinawa the string didn't seem very strong, and pulling strings was someone else's job. The Nip was through and the whole business was going to be over and the mileage across the Pacific from Okinawa to the Golden Gate had suddenly shrunk to ferryboat size.

The climax was unprecedented. For the first time in history a major power had fallen without the traditional storming of his citadel by land or sea. Japan had decided to call it quits before being invaded. Undoubtedly the threat of impending invasion and the Allied amphibious advances of the past year had contributed greatly to the enemy's decision. But in the final analysis it was land-based airpower that had been the driving force throughout the Pacific war, and it was the atomic bomb dropped by the AAF that had provided the coup de grace. The men of Okinawa knew this and everyone felt proud inside.

Some of the men on the island who were cut off from outside communications took the alert and shooting for what they appeared to be. They concluded that the Japs had landed paratroops or airborne infantry on the Okinawa airstrips, as they had done a couple of months before. Only two nights previously, the Nips had been over the island on reeco and to drop some bombs. The stage appeared set for a major effort to interfere with the vast military program on Okinawa, where bulldozers and trucks and steam shovels were putting the finishing touches on the world's largest airbase and where the AAF was bringing together its units from all over the world for the final push. But finally they learned that the last round had been called off and that the fight was over. To all intents and purposes, the war ended for the men on Okinawa on the night of August 10.

It was virtually the same story that night wherever AAF personnel were stationed throughout the Pacific; the first rumors of a Jap surrender offer touched off spontaneous celebrations that flared up quickest and loudest from those who were closest to the fighting. On Guam the news was greeted with an unrestrained night-long demonstration of joy. Aircrews of the B-29s shouted and pounded each other on the back; Waes wept with happiness; bottles of hoarded whisky suddenly materialized from nowhere and added to the jubilation. Few AAF men doubted that the United States would accept Japan's offer. "Thank God, there'll be no more bombing missions" was the general feeling.

In Chungking, the first premature flash set scores of firecrackers popping in the narrow streets, their explosive rattle mingling with shouts of "Ding Hao!", as grinning Chinese saluted AAF personnel celebrating what looked like the end of the war. To China it meant the finish of a 14-year struggle. To GIs it meant just one thing—home.

When the first unofficial bulletins hit Manila, guys just sat around and stared at each other with a feeling of frustration. For lack of a better way to blow off steam, officers gathered at the Officers' Club, drank Filipino gin and got noisy. Night clubs in Manila filled up. Soldiers went up and down the streets, shouting, singing and laughing; every now and then someone would fire a .45 into the air as if to get something out of his system. But most of the men sweated it out by the radio, waiting for official word.

General George C. Kenney, commanding general of the Far East Air Forces, tried hard that night to get some definite word on the surrender. After sitting up most of the evening trying the radio, he is said to have called A-2 in the early morning hours. They didn't have a thing. He called A-3. Nothing there. In desperation he flashed the operator; "Give me a cook; maybe he'll know something."

"Yes sir," replied the operator. "What cook, sir?"

"Any damned cook!" the general stormed.

The whole thing was fantastic. No one had expected the Japs to give up so quickly, certainly not without some retaliation for the atomic bomb. On Okinawa, only a few

nights before, all AAF personnel had been called out for gas drill and gas masks, protective covering and ointments were carefully checked. It had been a week of news and rumor. Biggest sensation, of course had been "the bomb." Mess halls, latrines, jeeps and airstrips buzzed with gossip about the atomic job the B-29s from the Marianas had let loose. Early reluctance to believe in its reported make-up changed to frank amazement as confirming reports piled in. Airerews returned to Okinawa from missions over Japan with tales of seeing a smoke column whirling 40,000 feet into the air above Hiroshima. "Most amazing thing I ever saw," said the airerews, and ground men were convinced.

Then Russia entered the war and they knew it was clear now that the Nip was on the ropes. Next came rumors of peace feelers—through Russia, through Switzerland, through everyplace from the White House to the local latrine; still few people actually expected that the Japs would toss in the imperial towel just two days later.

It was still unofficial, however; the enemy had only offered us a conditional surrender, and the war went on while the diplomats dickered. Saturday, August 11, was

"An officer struggled with a wheezy old pump organ to render 'The Star Spangled Banner'."

just another day of work. In Manila, it was business as usual. Okinawa kept up its air offensive against shipping. Only Guam declared a truce and held its B-29s idle for further word. At 0100 Sunday morning Manila time, Secretary of State Byrnes announced Allied acceptance of the Japanese offer provided the emperor would be subject to our orders. Most of the world settled back to wait for the Jap reply, but to the war-weary AAF men in the Philippines, this was it. Boat whistles moaned in Manila Harbor; searchlight beams stabbed the sky; from the tent area at the Fort McKinley headquarters of the Far East Air Forces came the throaty roar of massed men's voices.

But once again the celebration was premature, and the war dragged on in a spluttering uncertain fashion like a damp string of firecrackers. While the wheels of international protocol ground on, flyers took off from Okinawa on missions against a foe who might have surrendered by the time they reached his shores. On August 12, when diplomatic negotiations for peace were at their height, a Jap plane scored a direct hit on the battleship Pennsylvania with an aerial torpedo and killed 20 of her crew. The next day 20 enemy fighters came up to attack a flight of P-47s on a sweep over Korea; 18 of the Nips returned to the ground—in flames, one was shot up on the ground, and the twentieth was listed as a "probable."

On Guam, where an unofficial truce had been declared, the hours ticked by into days. An ominous feeling of tension spread over the island like a thunderhead. B-29 crews stayed by radios, their ships grounded until Washington or Tokyo made up their minds. Even the garrulous Domei Radio had been silent for over 24 hours. It began to look as if the Jap was up to one of his old tricks, stalling for time. On the morning of August 14 word went around that if no answer had come in by 1730, operational missions were to be resumed. It looked as if the war was on again.

At 1420 Col. Carl R. Storrie, CO of the 314 Bombardment Wing, called in his men for briefing. He told them their target for the night: Kumagaya, a small industrial city of 49,000. No one showed the slightest signs of enthusiasm; it was like telling the winning team to go out and play the last game over again.

The planes remained on the ground until the last possible minute, waiting for the word that never came. Finally they took off at 1807 and headed into the dark skies. Radio operators maintained a constant alert for the code message "Utah, Utah, Utah," which would mean that it was all over. It never came, and 0132 hours on Wednesday morning, August 15, one more Jap city took a beating.

Sgt. Herbert C. Verry, radio operator on the last Superfortress believed to have dropped bombs on Japan, commented: "I think all the radio operators were more intent on this mission than on any other. They told us a code message might be coming over, and I was on the receiver until the last moment, even while we were over the target."

By the time the planes had returned, it was over.

AAF personnel in the States got the big news shortly after 1900, Washington time, on the 14th when President Truman announced to the world that Japan had agreed to accept the Allied surrender terms. From Times Square to the Golden Gate, air force men joined in celebrations.

In London, cheering GIs and girls paraded around Piccadilly Circus carrying American flags. AAF personnel in Paris got the news at midnight and within a few minutes soldiers and Waes in one billeting area poured onto the parade grounds and began snake-dancing around a huge bonfire that was being fed with signs reading "Officers Only," "Wac Area" and "Males Keep Out." A motorized cavalcade of Waes and enlisted men took over the city's main boulevards, six vehicles abreast, and the strains of "Pack Up Your Troubles in Your Old Kit Bag" echoed through the streets. The driver of one jeep, on which 27

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ATOMIC STRIKE

Great billows of smoke and debris rise 20,000 feet as Hiroshima becomes history's first victim of an atomic bomb on August 5. Later reconnaissance photos showed the city approximately 60 percent destroyed.

AP

← Circle Represents Maximum Damage Area, Radius 1¾ miles

This was Hiroshima before a single B-29 dropped one bomb by parachute over the city. There were streets, buildings, factories, houses and people. The aiming point of the bombardier is shown in the lower left.

AP

A reconnaissance plane took this picture on the day the bomb was dropped. Clouds of smoke continued to obscure target for several days. The first atomic bomb had a blast effect equal to 20,000 tons of TNT.

Most of Hiroshima was dust when smoke cleared and flames died down days later. Tens of thousands of people were killed in the explosion. Another atomic bomb fell on Nagasaki before Japan surrendered.

OUR POWER TO DESTROY WAR

BY GENERAL OF THE ARMY H. H. ARNOLD

Commanding General, Army Air Forces

Today we must look to the future. We have come victorious through the greatest war of all time. It was not a war which we sought, or for which we were ready, so not unnaturally we faced moments of great danger and deep discouragement. With enormous effort and at heavy cost we surmounted them. This is a proud and jubilant moment, but let us not forget that it is also a fateful moment. Today, in the hour of triumph when it is only human nature to be affected by sentiments of relief, optimism and hope or wishful thinking, we must make decisions on which will depend to a great degree the permanence of peace, the fate of our country, and perhaps even the existence of human civilization. Our wartime responsibilities were heavy, but none of them was heavier than this responsibility that comes with peace.

From certain typical bases on the accompanying map have been indicated comparative ranges of effective air offensive action. Areas inclosed in the solid black lines can be dominated from the respective bases by airpower in terms of planes operational today—specifically, the B-29s. The broken line around the Aleutians base indicates the relative extreme range of the B-17 and the B-24, now obsolescent—and you can see why.

With planes of the range of the B-17 and the B-24 we knocked out German airpower and enabled our ground-sea-air team to conquer Germany. With planes of the operational range of the B-29 we were able to bring about the surrender of Japan. For any consideration of the future it is vitally important that we understand exactly how that surrender was brought about.

I am not referring now to Who Won the War.

No one arm, no one service, no one of the United Nations could or would claim the credit for what everyone must now realize was a vast and well-coordinated joint effort. It took, working together, all arms of the U. S. services, all services of our fighting, cooperating Allies, and the enormous industrial powers of the United States.

Nevertheless the decisive part played by airpower in the defeat of Japan without the necessity for an invasion of the home islands can scarcely be disregarded. A modern industrial nation such as Japan would not have admitted defeat at this stage of the war unless her industrial potential had been hopelessly weakened, the morale of her people seriously affected, and her isolation from the essentials necessary to wage war rendered virtually complete by blockade and the destruction of her navy and merchant fleet. The fanatical Japanese would never have offered to accept the crushing terms of the Potsdam ultimatum merely because the odds against them rendered "victory" of any sort impossible. The Japanese Army, although it had been hurt, was still a powerful force capable of inflicting heavy casualties on an invading force. The Kamikaze Corps had shown its capabilities in the Philippines and Okinawa campaigns and was preparing for an even greater effort against an invading amphibious force. Yet the Japanese acknowledged defeat because air attacks, both actual and potential, had made possible the destruction of the enemy's capability and will for further resistance. It had long been thought that it might be possible to bring about the defeat of Japan by air attack and blockade without the necessity of invasion, but war planners could never rely on victory without invasion. Though unprecedented in the history of warfare, this is what happened.

The destructive effects and increasing power of incendiary attacks on urban industrial areas, and high explosive attacks on critical war industries, principally the oil industry and the aviation industry, were principal factors in breaking the Japanese will and ability to fight. A long series of air battles drove the Japanese air forces, for all practical purposes, out of the skies, not only in the vast controlled areas, but over the homeland itself. Over the homeland, the Japanese were compelled to forego the defense of vital ta gets and yield air supremacy in an endeavor to recover enough to complete its destruction in a suicide role against an invading force. The destruction of the Japanese Navy was completed. The Army Air Forces shared with surface craft, Naval Air and submarines in the sinking of nearly 600 Japanese combat vessels. Aircraft are officially credited with sinking more than 2,000,000 tons of Japanese merchant shipping, of 1,000 tons and over, although in this respect submarines are primarily responsible for the reduction of the operational merchant fleet of a once great maritime power to substantially less than 1,000,000 tons.

Finally, there is the air contribution to the blockade and strangulation of the home islands. With the destruction of the Japanese Navy and the immobilization of the Japanese air forces, the U. S. and British land, sea and air forces completed the blockade of Japan. The sea-mining by B-29s immobilized hundreds of ships and sank dozens of others in the vital Shimonoseki Straits, and later coupled with aircraft and submarine attack, virtually cut off Korea and the mainland of Asia from the home islands through the mining of Korean and western Honshu ports.

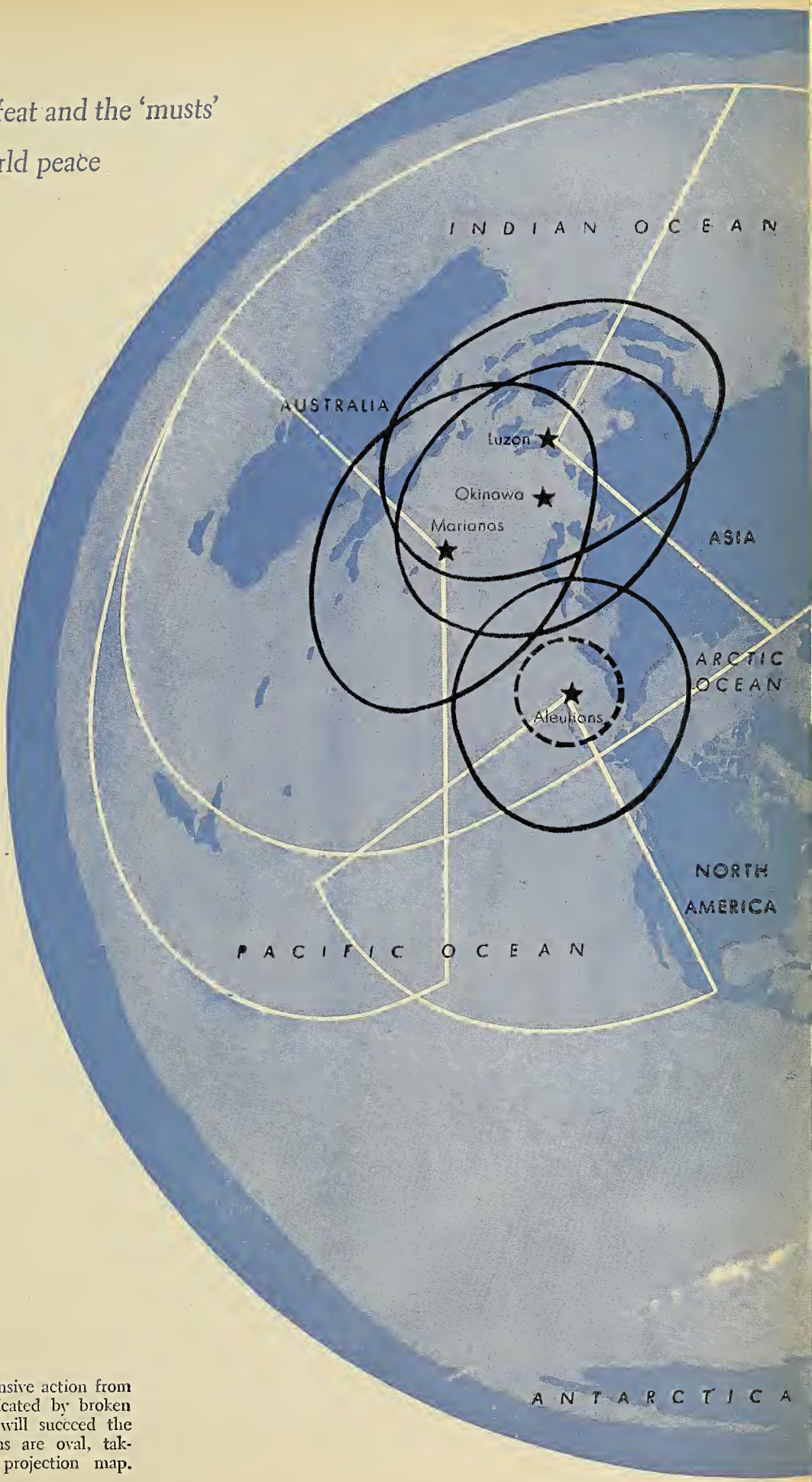
The collapse of Japan has vindicated the whole strategic concept of the offensive phase of the Pacific war. Viewed broadly and simply, that strategy was to advance airpower, both land and carrier-based, to the point where the full fury of crushing air attack could be loosed on Japan itself, with the possibility that it would bring about the defeat of Japan without invasion, and with the certainty that it would play an essential and vital role in preparation for and cooperation with, an invasion. The entire island-hopping

The strategy back of Japan's defeat and the 'musts' for airpower in maintaining world peace

campaign in the Southwest and Central Pacific had as one of its principal objectives the acquisition of airbases ever closer to, and finally within range of, Japan. These bases were also vital as Navy supply and mounting bases. They were essential in order to neutralize or knock out Japanese air strength, thus allowing the U. S. Navy as a whole, and particularly its offensive airpower, to be brought within range of the home islands themselves — something which would invite ruinous losses as long as Japanese land-based air strength remained full and effective. Finally, the bases enabled us to defeat every effort of the Japanese Army to stop the inevitable advance to the home islands in preparation for an invasion of Japan.

This, then, was how the surrender of the Japanese was brought about. I wished to stress it, because the harnessing of the atom and its dramatic use as the climax of this campaign has tended to overshadow a most important point When the atomic bomb was ready, we were in a position to deliver it, practically unopposed, to any point in Japan that we chose. The appalling effects of the delivery are shown in the Japanese Emperor's rescript announcing surrender.

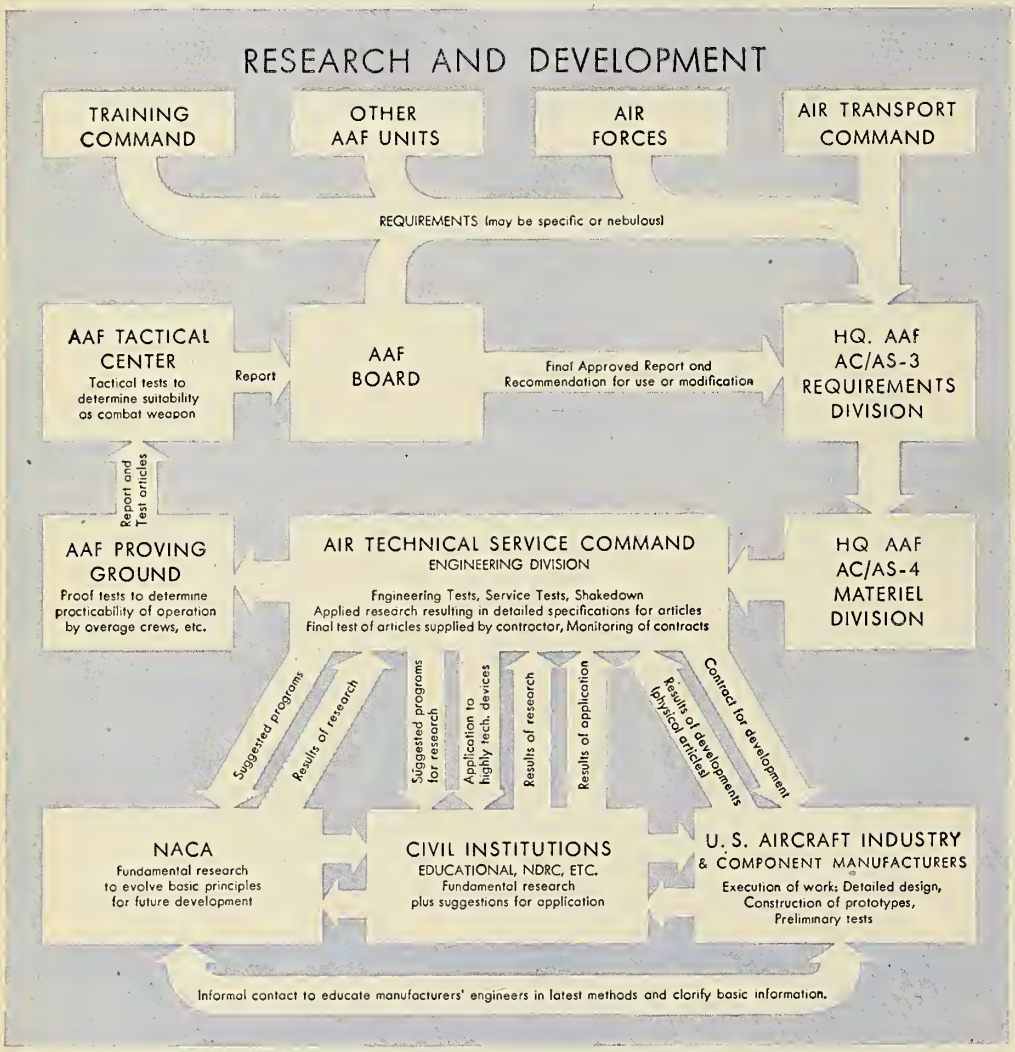
"Should we continue to



Comparative ranges of effective air offensive action from four typical bases: B-17s and B-24s indicated by broken line; B-29s by black lines; planes that will succeed the B-29s by white lines. Range indications are oval, taking into account distortion of polar projection map.

fight, it would . . . result in an ultimate collapse and obliteration of the Japanese nation."

This is true; but the Japanese situation was hopeless before that. There is reason to think that, from the Japanese standpoint, the atomic bomb was really a way out. Because the bomb was incredibly destructive, it was possible for the Emperor, without too much loss of face, to give up, as the only answer to this unheard-of development. The Japanese position was hopeless even before the first atomic bomb fell because the Japanese had lost control of their own air. They could not counter our air strikes, and so could not prevent the destruction of their cities and industries. They could not offer any effective opposition to the gathering of the immense forces of our land-sea-air team which was preparing to descend on their coasts.



These are the facts about the fall of Japan which we must keep in mind if we are to maintain the peace we have won at such cost. This is the lesson:

At no time in the foreseeable future can there be any security for a nation which, through ignorance, negligence or unpreparedness, allows itself to be put in that fatal position of Japan during the last year of this war.

There is also a lesson which you may be sure a future aggressor will take to heart. The greatest danger that any nation with a scheme for world domination faces is the United States. The last two wars have shown that no such scheme can possibly succeed as long as the United States is left free to throw in its unimpaired economic and military potential. Therefore, it will be necessary to dispose of the United States first, and, for the first time in history, disposing of the United States first may be practicable if we, at this fateful moment, make the wrong decisions.

Let us consider, in the light of weapons and techniques now available, or known soon to be available, what we may expect in a new war. On the accompanying map you see indicated by white lines the effective operating range of the airplanes that will succeed the B-29. What they will be succeeded by, we simply don't know, but we can be fairly certain about observable trends.

1. Manned or pilotless aircraft travelling at supersonic speeds. With such speeds aerial combat as we know it—fighters seeking out other fighters or bombers and exchanging gun fire in an attempt to shoot each other down—will disappear.

2. The extraordinary development of guided missiles and the refinement of their controls so that exact hits can be made on targets of a mile square or less, at any part of the world, from any part of the world.

3. Improved atomic bombs. They will be destructive beyond the wildest nightmares of the imagination—a weapon ideally suited to sudden unannounced attacks in which a country's major cities might be destroyed overnight by an ostensibly friendly power.

4. Great developments in the field of defense both against aircraft and against guided missiles by means of target-seeking antiaircraft missiles of rocket or other types. It will undoubtedly continue to be true that every new weapon of offense will eventually be countered by an at least partly effective means of defense. Against the supersonic planes and the highly developed guided missiles of the future it is probable that a defense in the form of missiles automatically seeking out those planes and missiles and destroying them or some of them, in the air, or the stratosphere, or the ionosphere, will be developed.

5. Perfected communications systems between air and ground making possible the most intricate maneuvers either by piloted planes or pilotless missiles.

6. An extraordinary development of the techniques of launching, landing and supplying airborne forces which can be dropped completely equipped at any point in the world in a matter of hours.

None of these things is visionary, or merely possible. They are probable to the point, almost, of inevitability. If we have another war—if another aggressor arises to strike the peace-loving nations, it will be with things like these that he strikes.

(Continued on Page 36)

radar bombing

How our electronic eyes removed the protective covering of clouds and darkness from the enemy's industrial cities and transportation centers

BY CHARLOTTE KNIGHT

AIR FORCE *Staff*

Pacific time, the day was August 9, 1945. And the weather was just what it had been on so many other B-29 missions for weeks—lousy.

Capt. James F. Van Pelt, the radar navigator in the Superfort "Great Artiste," looked out his window and thought how nice it would be sometime again to see where the Sam Hill you were flying. He could still remember when he'd have been plenty worried about navigating a plane in weather like this. Now, except for getting bounced around a bit, it didn't make much difference. He had plenty of confidence in his radar, and, fortunately, so did the other crew members.

There had been a time when even he didn't go all out for all this radar stuff they were going to put in the new bombers—queer-shaped antennas and a lot of fancy black cabinets that promised to bounce a self-respecting DR navigator out of business. But that was before he started flying long over-water flights to Japan.

Since then, Captain Van Pelt and every other navigator of a B-29 had learned to depend on radar almost exclusively to get them to the target and back again, and their respect for the "devices" could be measured in direct proportion to the number of missions they had flown.

On this particular mission, the gadgets were getting their routine workout. As the plane neared the Japs' own front yard, Captain Van Pelt divided his attention between two radar scopes: on his left his long-range precision navigation set—LORAN—from which he could get periodic fixes from two powerful radar beacons based at strategic points along his course; and on his right his PPI (Plan Position Indicator) scope; an auxiliary "remote" scope showing the same

In the month before war's end, blind bombing in the Pacific reached an all-time high with 78.5 percent of all 20th Air Force bombs being dropped by radar. July also saw a new record for radar bombing accuracy when B-29s, equipped with improved high-resolution radar, in just two attacks destroyed 95 percent of Maruzen Refinery at Shomotsu. Damage assessment photo shows accuracy of strikes.

360-degree scanned "pictures" of the earth's surface below and operating in the same way as the parent scope on the radar operator's BTO (Bombing Through Overcast) equipment aft of the tunnel.

Both the radar operator, S/Sgt. Edward K. Buckley, and Captain Van Pelt sat with eyes glued to their respective PPIs looking for radar check points—such as islands, coastlines, lakes, rivers and bridges—which could be recognized easily on the scopes. From them the navigator could check and correct his position.

In spite of the weather, Captain Van Pelt guided the plane expertly to the primary target. It was socked in. This was to be a visual bombing and the pilot, Maj. Charles W. Sweeney, made three runs on the target hoping to get an opening before he gave up. Then he told the navigator, "Let's try for Nagasaki."

That whitish blob on the edge of the scope—that was Nagasaki. Once again, the navigator brought the B-29 "reflections" from the Mitsubishi plant, approached the bombing circle, Sergeant Buckley called to Captain Beahan:

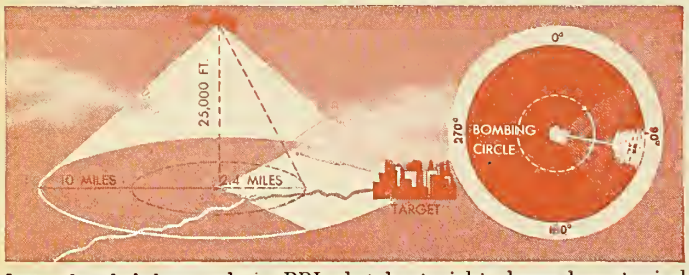
"Get ready for seven zero degrees."

At the moment when the outer edge of the specific target touched the leading edge of the bombing circle, he called, "Now!" and the bombardier made adjustments.

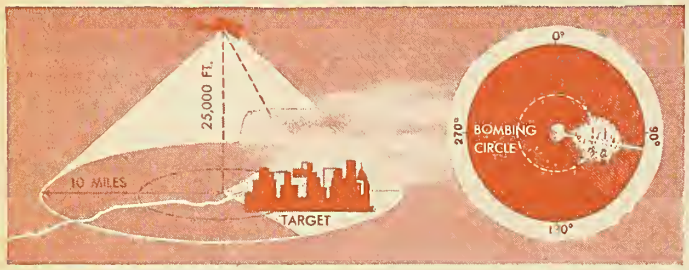
Captain Beahan kept his hand on the displacement knob. Sergeant Buckley called again, "Ready on six eight degrees . . . Now!" More often than not this procedure would have been repeated through each successive sighting angle until the point was reached where the bombs would be released automatically by the Norden sight.

But on this mission, just 30 seconds before bomb release, Captain Beahan sighted a tailor-made opening in the clouds.

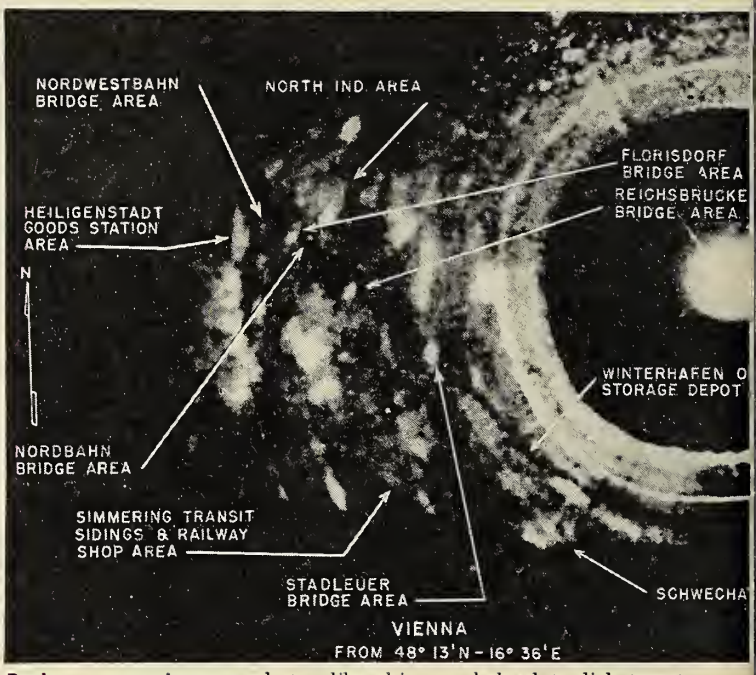
"I see it," he called to Sergeant Buckley, getting a perfect "visual" on the target. He turned dials in swift last second corrections and then, "Bombs—." Remembering, he grinned and corrected his report: "Bomb Away!"



Irregular bright patch in PPI sketch at right shows how typical target might appear in radar scope set at 10-mile range. Straight white "Lubber Line" indicates true heading of plane toward target.



As bomber nears overcast target, white area on scope moves closer to bombing circle, in this case 2.4 ground miles from plane. When center of target reaches circle, order is given for bomb release.



Radar reconnaissance photos like this one helped to lick target identification problem. Thorough advance briefing enabled operators to translate otherwise meaningless spots into specific targets.

right onto it. They found the Kyushu port city also overcast but there was not enough gas left to scout around for a more likely spot, so directions were given to prepare to bomb anyway.

Sergeant Buckley switched his PPI from 50 to 20-mile range, thus "enlarging" the picture on the tube and bringing into higher resolution lights and shadows which his experienced eye translated into land and water, built-up areas, shipyards, factories and docks. Slowly, as the plane sped toward them, these blurred images moved nearer the scope's center representing at all times the position of the plane. The radar operator set his computers for the correct sighting angles and a "bombing circle" was turned on the scope at the exact slant-range setting.

Meanwhile, the bombardier, Capt. Kermit K. Beahan, had adjusted his Norden bombsight on the basis of the latest drift speed, altitude, and so on. At this point he could not see the target to get the sighting angle, so the radar operator who could see it—electronically—fed the data to the bombardier over the intercom; and as that irregular bright patch on the scope, interpreted as radar

And the second atomic bomb to be dropped on the enemy islands descended toward Nagasaki.

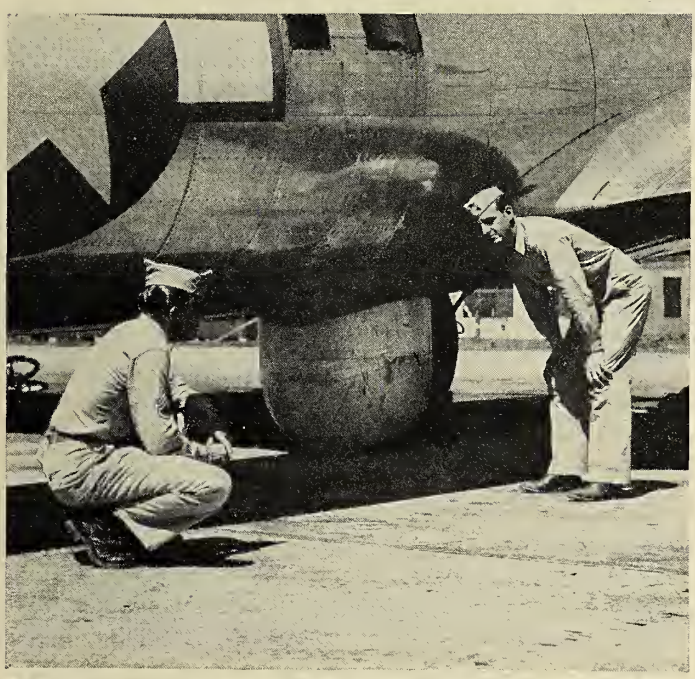
Except for the revolutionary character of the bomb load on the "Great Artiste," this Nagasaki mission was the rule and not the exception. Radar's tremendous role in the destruction and ultimate capitulation of Japan can now be measured partially in these figures: at least 70 percent of the bombing carried out by the very heavies was accomplished by radar in the coordinated radar-visual manner described above; complete radar bombing, including the actual release of bombs through solid overcast accounted for 50.6 percent of the bombs dropped from November through June, a period which included the good weather months over the Jap home islands. During July of this year, bombs dropped completely by radar during our great incendiary raids reached a high of 78.5 percent.

And this is but one part of the radar picture—the HAB (High Altitude Bombing) procedure using super-high frequency microwave BTO radar equipment in the 20th Air Force alone. If the LAB (Low Altitude Bombing) radar campaign against Jap shipping on the part of the 5th, 13th

and 14th Air Forces were taken into account, the percentages would be much higher. For instance, between those three air forces, more than half a million tons of Jap shipping were sent to the bottom by LAB radar operations alone in the first year of the equipment's use.

In a single month one B-24 squadron of the 14th sank 110,000 tons of enemy shipping in the China sea completely by radar.

But to get back to the 20th. Radar men feel that they have come a long way since that first shakedown mission over Bangkok on June 5, 1944. Lt. Col. K. M. Gonseth, a communications officer for the 20th Bomber Command, explains some of their early trials: "There had been such a rush to get the first Superforts to India that only a few arrived over there with radar equipment even installed. For the most part the sets, still in crates, had been hastily pushed aboard at the last moment. Radar operators fared almost as badly. Equipment had been so limited back in



Radar men examine a "radome," a familiar appendage on the AAF's heavy bombers. The radome houses the "spinner" or parabolic antenna used to transmit radar waves and receive returning "echoes."

the States that most of these boys had had practically no scope training in actual flight.

"Once they arrived in India, ground radar mechanics did a magnificent job of installation and servicing; in spite of excessive duty hours and adverse working conditions, they kept sets in superb working order. We set up training programs at bases in both India and China, and sent our radar operators along on the long gasoline-hauling missions over the Hump so they could train on scopes enroute. When the Bangkok mission was laid on, we still didn't feel that we were ready but at least we were a little better than when we left Kansas."

The results of that first raid did not make the 58th Bomb Wing (Very Heavy) very happy. Broadly speaking, only a small percentage of bombs landed near the target. If it did nothing else, the mission pointed up plenty of weaknesses, most of them boiling down to this: that radar operators simply had to get more training in scope interpretation before they could be counted on to identify targets with any reasonable degree of accuracy. Training was accelerated even more. Operators worked until they were scope-happy and gradually became more adept at picking out cities and plants from the mass of spots before their eyes.

And then from his China base at 1630 hours on June 15, Col. Leonard F. Harman pulled the first B-29 off the runway, barely cleared the trees and headed for Japan. About 74 other Superforts followed him. The target. the Imperial Iron and Steel Works at Yawata. It was already dark when the formation reached the China sea, but its islands made excellent radar check points and navigation on the mission was considered excellent. When they reached it, Yawata was blacked out and partially concealed beneath 5/10 cloud cover, so most of the bombs were dropped by the radar operator's own toggle-switch on the basis of scope identification entirely. Results again were not too good. More than a little damage resulted and it was conceded that some bombs *did* drop in the target area, but not many

This is probably as good a place as any to clear up a point or two concerning high altitude radar bombing by means of PPI pictures alone. It would be comforting to report that this most amazing of all radars would pick up the exact target desired and translate it onto the PPI in a flash reading: "This is the Kawasaki aircraft plant. Bomb here!" It's a long way from being that simple—yet. The equipment itself, while it was the best that could possibly have been developed in the time available, still did not have very good resolution. Consequently, it took a really skilled operator to interpret accurately the blurred land features on his PPI. At any rate any degree of precision required a good deal more practice than those early radar operators had had a chance to get. One operator summed it up this way: "Hell, we felt lucky if we could even spot the town, let alone find the specific target."

Finally, it must be remembered that these radar observers were flying over what was, for them, new territory. When the missions first started, there were no actual radar scope pictures to study, and the only advance indication they had of what would be likely to appear in their PPIs was to be found in an artist's drawings (based on maps and topographical studies) of what he thought would turn up in the scopes as planes flew over the target area. These preconceived drawings were excellent but they could scarcely take the place of the actual radar reconnaissance photographs which later were made of routes to IPs and targets.

Nobody was more aware of their weaknesses than the radar men themselves, and they proved just as anxious as their commanders to whip this target identification problem. They trained on the ground and they trained in the air—and kept right on training between missions. Supersonic trainers finally arrived from the States and these, by means of accurate terrain models of the area over which the bombing missions were to be flown, were capable of simulating actual scope presentations of what the radar operator would see in flight. These helped considerably.

"Offset" bombing was developed and this helped, too. This technique has often been compared to that used by a golfer who aims for the cup by sighting on the flag. Because specific targets, such as buildings, refineries, marshalling yards and the like seldom are easily discernible on the PPIs, the radar operator must pick as his offset aiming point some nearby point which does show up with clarity. By pre-determining the exact distance of this check-point from his unseen target, he can clock a time-delay from the AP to the actual bomb release point.

Sasebo, Manchuria, Palembang, Nagasaki, Tokyo—the raids were stepped up. And though the increased skill of the operators began to pay off in higher bombing accuracy, it was still a long way from pin-point. Radar is ideal for

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THIS IS YOUR ENEMY

. . . in the throes of defeat

"Endless throngs of worshipers came to the Plaza before the Imperial Palace. . . ."

BY MAJ. HARRY H. RANSOM
AIR FORCE *Staff*

"Finis" was written to the story of Japanese airpower in various ways. None was more telling than the conclusion scrawled by an AAF tech sergeant on Sunday, August 19. Winding up his assignment as a "631," whose daily job had been to provide his unit with air statistics on the enemy, he posted only one line that morning: "Jap Aireraft Operational—Two transports, white, with green crosses."

Like the statistics on Germany's surrender, however, the figures somehow got unhinged from reality. The fact was that Japan had ended the war with about 5,800 operational aircraft. Even after surrender, some of the JAAF and JNAF reserve of about 3,000 fighters attacked B-32s flying reconnaissance missions. Whole depots of Bakas were left, and whole squadrons of dispirited pilots sworn to suicide. V-weapons were in the making; plans and models for them had been bought from Hitler in March, much to the widely publicized disgust of their German inventors, whose profit from the exchange was meager. New Japanese air training programs had been scheduled for autumn, and Allied intelligence had scheduled technical releases on new equipment ranging from a Jap ME-163 to the unproved trainer, Hickory.

Although the Kamikaze program had been withered by the law of diminishing returns, Japanese air leaders livened their early August propaganda with final threats to sink whole fleets of Allied ships and chase "America's 20 air armadas" out of the Pacific sky.

Precisely what it was that unraveled surrender out of this tangled mass of brag, politics, fanaticism, mysticism and military power may be arguable for years. The easiest answer —and that given most often—is "one atomic bomb on Hiroshima and one atomic bomb on Nagasaki." In a sort of rise-and-fall of horror, the Japanese had described the missile as "a new weapon," "a searing explosive," "an atrocious, barbarous, beastly device," and "The Atomic Bomb."

But *Mainichi Shimbun*, which joined this horrified chorus, denied that Japan had surrendered to mere uranium. Nippon's cause had been lost for months, the editor explained. "This is not negotiated peace; it is one-sided defeat." *Yomiuri Hoehi* took a similar but more subtle view, colored with wistful humility. Its editor reasoned that if one bomb or two bombs destroyed the golden prospect of Japan, note should be made of the scientific superiority which put conquest into so small a package. "It would be much to our good," he concluded, "to accuse ourselves of being so incapable."

Apart from dramatic emphasis on the atomic bomb, other immediate causes of defeat were cited, including the 20th Air Force's maddening latter-day custom of "calling its shots" before large-scale missions.

Whatever the immediate military causes of surrender may have been, Hirohito was the sole agent. For some days before Japanese newspaper or radio commentators suggested anything worse than hard times ahead, the nation's war conscience was focused in the Emperor. Gradually, like a Siamese cat cautiously pawing a shark's fin, the propagandists touched upon the possibility of surrender. "There is not a soul in Japan," declared one announcement, "who does not grieve in his present desire to do whatever he can to bring ease to the mind of His Majesty by quickly eliminating whatever may be troubling his Emperor." This exalted theme of pure sympathy between people and throne was occasionally punctuated with homelier details—pictures

of the Crown Prince, his daily schedule, appointment of his new tutor, accounts of his deep concern for the populace.

Then the unbelievable happened. As irreverent Amerieans put it, "The Emperor grabbed a mike." To the Japanese, his speech seemed the most moving threnody in their national history—which has never been conspieuous for its gaiety. "August 14 of the year 2605 of the Royal Calendar was a fatal day, a day of noble inspiration," intoned the official radio. "The Emperor spoke personally to 100,000,000 subjeets. . . . Thus the destiny of the Japanese people is expressed in oneness with the Thronc." This unity has been described with delicate emotion by the Emperor in such lines as "we shall be with one another always."

So the tempest that Japan had fatefully brewed on Deeember 7, 1941, expired in a tea-cup. As if he were arranging cherry blossoms, Hirohito accepted the terms of Potsdam. "For the sake of civilization . . ." he declared. "Listen, listen to the August Wish of the Emperor," chimed in all propagandists. So the ritual went on and on, for days. Finally the fact emerged from the mist: Japan was done for.

Although Japan was done for, anybody who expeeted Hirohito's subjects to get out the family swords and knives or hug grenades to their bellies or go marehing off into the sea soon learned better. "No nation has the right to commit suicide," proclaimed the headquarters of the Kamikaze Corps. Thc hours of pondering and capitulation which followed bore no resemblance to the swift and sinewy attacks on Pearl Harbor and the Philippines; the new government's announcements lacked that mad savagery that threatened to behead all enemies who came by air.

Nevertheless, this elaborate funeral ceremony, the lyrical business of the God-Emperor, very soon let in the noise of hard, fast, tough talk about Japan's destiny and how to attain it.

First hint of this new line came from *Mainichi Shimbun* and *Yomiuri Hochi*, both of which advised that in carrying out Hirohito's "August Wish," Japan should "keep free from all past entanglements and prejudices." Forthwith, this resounding theme of a new day coming was taken up by ministries, editors and many professional spokesmen of all stripes.

Finally they stared unblinking at the facts. The *Nippon Times* summarized conditions sharply: We need shelter, we need food, we need elothing. Food was no minor problem. Daily rations in some plaees had been cut to 300 grams of rice or the equivalent. Shelter, especially in the bombed cities, was badly needed. The capital noted eneouragingly that 1,200 emergency dwellings were left over from the war program—houses of two rooms capable of putting a roof over 20 people.

The Japanese aircraft industry announced plans to convert to peaceful production. The Japanese air forces hopefully suggested that their uniforms could be converted to work clothes. *Sangyo Keizai* took this as symbolic—thus Japan shucks off war and puts on peace. "The foundation of a country, after all, is civilian strength," the editor explained, and did not wait for the ghost of Yamamoto to answer. To this generalization, however, he did add the suggestion that civilian livelihood be guaranteed. Other writers took up the chorus: Industry must be converted. Credits and debts must be adjusted. Inflation must be hedged by compulsory savings and taxes—although no immediate restrictions were laid on withdrawal of deposits. In this scheme of recovery the central figure was the Japanese farmer. Service groups of the air forces were immediately urged to get to work repairing farm machinery. Demilitarized communications units were assigned the job of rebuilding telephone lines. Japanese police, civil and military, gave less attention to "thought control" and more to the knotty problem of keeping evaeuees from pouring back into destroyed cities.

All this reality was skillfully linked to former grandeur by Aikichiro Fujiyama, president of a Japanese economic federation. "We will doubtless return to the status of a small island empire," he declared, "but our spirit must shake itself free of provincialism and return to the magnanimity of the Kamiyo era." A colleague of shorter wind added simply, "The people must be encouraged to develop political sense."

For a day or two, political sense continued to smother itself in defeat. Endless throngs of worshipers came to the Plaza before the Imperial Palace and to the precinct of the Yasukini Shrine, dedicated to Japan's war dead. Former air defense officials wrote new equations of war value—the loss of Saipan and the damage done to the Grand Shrine of Ise, the loss of Iwo Jima and injury to the Meiji Shrine, the conquest of Okinawa and threat to the Imperial Palace from the air.

Among the most articulate Japanese to raise their voices in the midst of so much lamentation were the scientists. President Tada of the Board of Technology condemned any wishful thoughts about inventing a Japanese vengeance weapon to offset the atomic bomb. As an alternative, he suggested that all Japanese laboratories—air, ordnance, chemical—be devoted to a new science of living. Out of tune with the previous announcements, he prophcsied "a great new religion and a new religious leader." Forthwith, his speech was canceled and its echoes drowned in the growing shouts of racial determinism. Dr. Tada's colleague, Dr. Hidetsugu Yagi, handed *Mainichi* a more specific plan for the future. Defeat, he reasoned, had come about through "jealousy, narrow-mindedness and domination cultivated during the feudal age." Relief from such a heritage could be expected only from men under 30 and from scientists first.

"Though Japan is disarmed, though her war machinery is dismantled, science can never be suppressed," he declared.

Education was also included in the exhortations to save Japan. In the name of the Minister, teachers were advised to devote themselves utterly to defense of the national structure. "Students should be determined to recover the national might from the scorched earth." The Imperial forces scattered on islands by-passed in the American sweep up the Pacific were reminded to keep first in their thoughts "the preservation of the everlasting foundation of Japan." Premier Prince Higashi-Kuni, dismissing the war with China in a casual allusion to that "Incident," predicted a New Social Order and, somewhat more smoothly than his colleagues, hinted that there need be no repetition of unhappy warfare if only the nations "would encourage each other in the development of Greater East Asia."

Mainichi Shimbun (by the same pen that had recently

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Long Legs

BY MAJ. MILTON R. KRIMS

AIR FORCE Overseas Staff

It seems almost a lifetime ago when Buna and Lae and Salamaua were still occupied by the Japs, when the few available B-17s and B-24s flew without fighter cover, when P-39s, P-40s and even P-38s strained to complete a three-hour combat mission.

In October of 1942, it seemed reasonable for the 5th Air Force to request a fast, high altitude, extremely maneuverable, well armored fighter with a safe combat radius of action of at least 600 miles. From Moresby, it was approximately 600 miles to Wewak and 600 miles to Rabaul, the two key targets in the still very young air war against Japan. It was also some 600 miles from Wewak to Rabaul. Here was the triangle pointed like a threatening—and to the Japs, irresistible—wedge at the Moresby toehold and at all Australia beyond.

Then Australian forces stopped the Japs on the south side of the Owen Stanley range, hardly more than 30 miles from Moresby, and later the 6th Army and the Aussies drove the Japs out of Buna. Meanwhile, the 5th Air Force continued to fly its heavies and mediums with a minimum of fighter cover, sometimes with none at all. Out of necessity, the 5th modified its planes and developed new techniques—package guns for the B-25s, skip bombing. But longer-range fighters were needed because the 5th knew a bomber without fighter escort is like a boxer with only one fist.

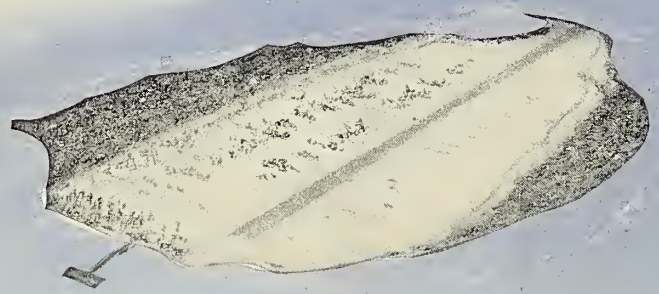
The idea was to isolate the Jap in New Guinea, cut off his lines of supply, neutralize, and then occupy at will if necessary. It meant our fighters as well as bombers would have to reach out to Wewak, Rabaul, Hollandia, Gloucester, Wakde, Biak, Noemfoor, Palau and other distant targets. General Kenney called it Air Blockade. The slogan—reputedly coined by General MacArthur—was Advance the Bomber Line. This was true air war at its best, the pattern for the march back to the Philippines.

The fighters strained but couldn't quite make Rabaul or Wewak. Vastly outnumbered in the air, they still beat the Japs every time they met. But their legs were too short. Yet Wewak needed to be neutralized before the war could proceed according to plan. So at Tsili Tsili, 200 miles northwest of Buna, in a spot accessible only by air, a base was scratched out of the kunai practically under the noses of the Japs. Now the fighters had a place to refuel. On August 17, 1943, a force of B-25s hit Wewak strips for the first time from low level—and they had fighter cover. The Japanese lost over 200 airplanes on the ground. Tsili Tsili was never used again after that one strike.

By November, 1943, fighter range had begun to increase. The P-39s stretched to a combat radius of 310 miles, the P-40s to 445 miles, the P-38s to 575 miles; new P-47s could manage 445 miles. But we were also closer to the enemy; we were in Dobodura, Nadzab, Lae. Most of the fighters had moved up, some into the Markham Valley as far as Gusap and Dumpu. There was fighter cover for the strikes against Rabaul and Wewak and all the targets within the triangle. In fact, the triangle had been crushed into a geometrical oddity. We were reaching out.

By the beginning of 1944, we were doing business from Gloucester. Rabaul had become nothing more than a

To win the air war in the Pacific meant conquering tremendous distances. Long before V-J day our P-38s were flying 11-hour missions and shooting down Japs 950 miles from base



problem in attrition. Even Wewak was no longer troublesome; it had never quite recovered from the August strikes. Incessant pounding by fighter-protected heavy and medium bombers had left Wewak numbed if not yet completely knocked out. Hollandia was next.

P-38s could reach Hollandia now, but the Japs didn't know it because our fighters had not flown closer than Tadji, 125 miles to the southeast. It was a case of deliberate deception and it paid off on March 31 when the 5th Air Force hit Hollandia with everything it had in the first daylight, fighter-protected strike on that target. The Japs must have gaped at the swarms of fighters that covered the successive waves of heavy, medium and light bombers. The surprise was complete.

That first strike practically eliminated the defenses of Hollandia. Successive attacks met little opposition and cleaned up what was left. When the landing was made April 22, the Navy's carrier-based aircraft met no opposition and the troops moved in standing up.

But something more than tactical surprise was playing havoc with the Japs. Something was happening to the fighter pilots themselves. The old, carefree days of instinctive, extravagant flying were over. Technical experts and test pilots—men with cold, analytical, bookkeeping minds—were teaching them new techniques. These men—among them Col. Charles A. Lindbergh and technical representatives, Joe Parker of Republic Aircraft and Frank Meyer of Lockheed—contributed new ideas, demanded a new kind of flying discipline. Fighter pilots learned how to fly according to a flight plan. They learned cruise control and the mathematics of gasoline consumption in relation to mileage, altitude and power settings. They learned new tactics, the self discipline of making one pass at enemy aircraft under certain fuel conditions, of not going downstairs to meet an enemy coming up, of going home if the enemy didn't come up soon enough. It was a tough transition for many a happy-go-lucky fighter pilot, certainly a minor revolution in his psychology of battle. But it was the beginning of the kind of thinking that made future results possible.

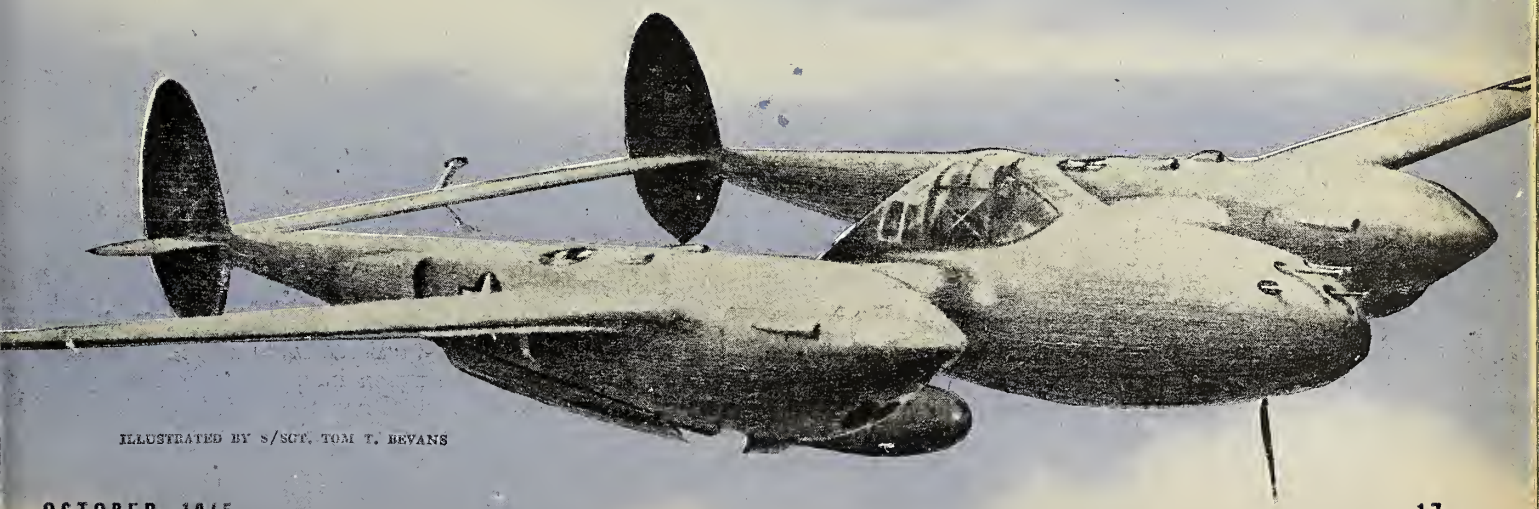
By late September, 1944, fighters in the Southwest Pacific were beginning to take really long strides. P-38s carrying 425 gallons of fuel in internal tanks and 330 gallons in external tanks, were capable of fighter sweeps and medium bomber escort missions up to 795 miles. By carrying the same amount of fuel and rendezvousing 50 miles short of the target, they were able to perform escort missions with heavy bombers up to 690 miles. The twin-boomed fighters, carrying one 1,000-pound belly bomb and fueled with one 165-gallon drop tank and 425 gallons in internal tanks, could make dive bombing missions up to 587 miles. With 425 gallons carried internally, the P-38 was capable of missions with two 1,000-pound wing bombs as far as 375 miles.

At the same time, the new P-47D28 could perform fighter sweeps and medium bomber escort missions of 690 miles when fueled with 370 gallons carried internally and 330 gallons carried externally. For heavy bomber escort, rendezvousing 50 miles short of the target and transporting the same amount of fuel, this fighter could make missions of 430 miles. For dive bombing, carrying one 1,000-pound belly bomb and two wing tanks, it was capable of 690 miles. With one wing tank and one bomb, it could make up to 518 miles; leaving off the external tank, it could pack two 1,000-pound wing bombs on missions up to 320 miles.

The P-39s and P-40s were virtually retired. Stateside factories were going all out producing new fighters, the designers benefiting by lessons learned in the combat areas.

With each passing month, the 5th Air Force grew greater in numbers and striking power. It was joined by the 13th—the Jungle Air Force—to form the Far East Air Forces. The Moresby-Wewak-Rabaul triangle had been broken into a series of little circles to be erased when time and material could be spared. The game of hop, skip and jump had moved into a bigger league; General MacArthur was getting set to return to the Philippines.

On September 2, a formation of 5th Air Force fighters made the first land-based sweep against the southern Philippines. They were joined by two fighters from the 13th Air Force. Equipped with detachable gas tanks, the fighters covered 1,400 miles in what was believed to have set a new over-water combat record for fighters. Lt. Glenn A. Starman destroyed a Jap fleet plane, the first shot down by an American fighter over the Archipelago since the fall of Bataan. They hit again September 6, strafing Mindanao targets, striking at airfields, coastal vessels and shore installa-



ILLUSTRATED BY S/SGT. TOM T. BEVANS

tions. Fighters of the 13th even shot down an enemy transport that somehow wandered into range.

The fighters began hitting the southern Celebes and Indo-China. They cut deeper into the Philippines. They were going wherever the bombers went—almost. And every day they found out something new about increasing range.

They learned new angles on the problems of gas consumption; they could estimate with reasonable accuracy how far it was possible to fly on gas from one belly tank at varying altitudes and speeds. They experimented with 310-gallon tanks, then with combinations of 165- and 310-gallon belly tanks. With these two tanks, the P-38s could load a little over 900 gallons of fuel.

Fighter Command statisticians, especially those of the 13th Air Force, made extensive studies of fuel consumption on long range missions and arrived at some basic conclusions. A recent report provides the following breakdown based on a P-38 carrying one 165-gallon and one 310-gallon tank:

1. At 2,000 rpm, 34 inches manifold pressure, auto lean at 170 mph, an average climb of 200 feet per minute can be maintained up to 10,000 feet. Average fuel consumption is 40 to 50 gallons per engine per hour.

2. At 2,000 rpm, 30 inches manifold pressure, automatic lean, altitude from 9,000 to 10,000 feet, an average indicated air speed of 190 mph can be maintained for the first two hours and increased thereafter to 195 mph as fuel is consumed. Average fuel consumption will be 35 to 40 gallons per hour per engine.

3. After dropping the 310-gallon empty tank, an increase of 5 to 6 mph can be obtained over these figures.

4. A total of 5½ to 6 hours' fuel supply is available in the drop tanks with engine settings at 2,000 rpm, 30 to 34 inches manifold pressure, auto lean.

5. Over the target, engines are maintained at 2,600 rpm and 34 inches manifold pressure, auto rich. On return from the target a setting of 1,680 rpm and 28 to 30 inches manifold pressure, auto lean, is maintained with an average indicated air speed of 190 to 200 mph.

6. The radius of action of the P-38 type aircraft using one 310-gallon drop tank and one 1,000-pound bomb is reduced to 800 miles.

Procedure for selecting tanks was carefully studied. It was found best to drop the belly tank first, then use the wing tanks, running them out evenly at one-hour alternate intervals. Experience showed most belly tanks don't feed well above 5,000 feet, thus limiting the first hour of flight to that altitude. Since flying at low altitude is always economical, the fighters so equipped delayed before climbing to altitude desired over the target as long as the tactical situation permitted. They preferred to reach altitude 10 to 15 minutes from the target.

They learned other things. For example, the 310-gallon drop tank had a tendency to sag when filled. Rechecking of all sway braces by mechanics just prior to takeoff made sure all were taut. Sometimes the tanks failed to release properly and hit the coolant and horizontal stabilizer. Pilots learned to maintain a 160 to 170 mph air speed, flying in a slightly nose-low position, wings level with no slide or skid. At the instant of release, they pulled the nose of the plane through the horizon, forcing the nose of the belly tank down away from the wing and catapulting it clear of wing and tail surfaces.

The fighter pilots seldom had been confronted with difficult navigational problems. But now they were expected to fly over water, rendezvous with bombers at some pinpoint in a seemingly limitless sea. It was one thing to locate a mountainous mainland, another to locate a coral reef somewhere, for example, between Palawan and Indo-China. Sometimes B-25s were used as navigators. But mostly the fighters flew on their own. Their pilots learned that navigation was not the problem they had anticipated. With courses and ETA set well in advance, they had little trouble reaching their targets and returning to their bases.

But long flights created another problem. Did you ever try sitting in your most comfortable chair continuously for seven or eight hours without falling asleep? You might as well have the room at your favorite temperature to make the picture complete. Of course you're wearing loose-fitting, comfortable clothing. Even so, you're bound to get restless, even with a good book, plenty of cigarettes and plenty of your favorite drink. Now throw away the arms of the chair, the book and the bottle, get the temperature up to about 110 degrees, shove a parachute pack and tightly-packed one-man life raft under your posterior, stare continuously at about 23 dials and almost as many gadgets. Give yourself navigation and cruise control problems on which your very life depends, watch continuously for enemy aircraft and shipping and, by the way, think of the target and what the enemy may do to you if you make a mistake. And don't forget to put on a Mae West, your pistol belt with the old .45, two canteens full of water, your jungle knife, jungle kit and first aid kit and wear GI boots so you can walk through the jungle if necessary. Now put on a radio head set for seven hours and never stop listening to screaming, howling static and piercing calls from radio stations. And be continuously alert for calls from your leaders or fellow pilots.

All this took stamina—and sometimes benzedrine. The air surgeons worried over the strained faces and taut nerves of returning pilots. More than anyone else, the medics marveled at the remarkable stamina of the pilots who seemed always to be ready to fly again after a very short rest. Some have been known to fly 32½ combat hours within four days.

In October, 1944, the B-24s of the Far East Air Forces started strategic missions against Balikpapan in Borneo. Flying without fighter cover, they ran into serious trouble with Jap fighters, and they lost airplanes. Obviously, to be successful the B-24s required fighter cover.

But the nearest base was Morotai, 800 miles from Balikpapan, and the strips there were dangerously short. Biak and Sansapor in New Guinea were even farther away. Fighter pilots discussed the problem and came up with a suggestion. They would take off from Biak and Sansapor, accompany the bombers to Balikpapan and then when they were out of gas, bail out into the sea. This was no Kamikaze, no Banzai suggestion; the pilots fully expected Catalinas and submarines to be around to fish them out of the drink. But it was a long chance and the offer was refused with thanks. Instead, the experts did a lot of pencil pushing, and finally decided that the fully loaded planes could take off from Morotai by using every inch of the strip.

On October 10, P-38s of the 49th Group left Biak for Morotai. There they were joined by P-47s of the 35th Fighter Group. Together they totaled 40 fighters. They were expected to make a 1,600-mile round trip to Balikpapan, up to then probably the longest single-seater fighter combat flight in history.

The fighters loaded up with two wing tanks full of gasoline in addition to their regular fuel load. The planes were pretty heavy when the ammo for the .50-caliber and 20-mm guns was added. Take-off times were staggered and one by one the pilots preflighted their planes until the air was full of the sounds of throbbing engines. Pilots and crewmen waited tensely for the first plane to get off. The pilot was Lt. John R. Young, subsequently killed in action. Poised

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ILLUSTRATED BY CAPT. NORMAN F. TODHUNTER

Three Years Below the Mast

The coral of Okinawa Shima was being blasted and shoveled, trucked and scraped into the world's largest airbase. Air strength was being concentrated from all over the globe for the final push. The 5th Air Force was completing its move from Luzon and Mindoro; the 13th was coming in from Leyte, Morotai, Borneo and Palawan; the 7th, an early arrival from the Marianas, was being reinforced by B-24 Snoopers from the 14th in China and A-26s from the 15th in Italy; B-29 service units from India and staff personnel from Great Britain were reforming the 8th Air Force; units from the 9th were enroute from France.

It was the AAF's Grand Central Station. Everywhere on the island there was feverish anxiety to get operational. Groups took off on missions 24 hours after arrival, bags still unpacked. They had men, planes, bombs, mess kits, bed rolls and slit trench latrines. Ships overcrowded the harbors;

troop carrier aircraft shuttled in and out with cargo and personnel; the ATC terminal loaded and unloaded its C-54s; courier L-5s, the jeeps and staff cars of the air, were as essential as the daily weather reports. There just wasn't enough room on the island for everybody, yet somehow there was.

The first major objective in the air campaign from Okinawa after air defense helped make the island secure was the severing of the Japanese supply line through Tsushima Strait off the southern tip of Korea. By mid-August the strait was handling only a trickle of the vital eargo the Jap had once shipped through from the Yellow Sea aeross the Sea of Japan to the homeland. The main portion of the job had been completed in the two weeks following the initial strikes against the strait on July 25.

If the occupation of Okinawa was the beginning of the end for Japan—and it later turned out to be—the air offensive against the strait was another decisive step toward that end. In those first two weeks the Jap lost approximately 110,000 tons of shipping in Tsushima Strait. The climax came on August 6 and 7 when a convoy of 19 vessels, consisting of four freighters, four transports, eight tanker-types and three escorts, attempted to run the blockade. Fifth Air Force B-25 attack bombers of the 38th and 345th Groups, working by day, and B-24 Snoopers of the 43rd Group, working the night shift, sank 14 of the 19 vessels in the convoy, damaged and chased the others ashore. The B-25s accounted for 12 of the ships, Snoopers the other two.

This action wasn't large scale stuff by Paeific standards. The convoys, five in all during the first two weeks of the campaign, eonsisted primarily of small freighters and tankers of 3,000 tons or less. But the Jap was frantic for supplies and shipping was his big bottleneck. Most of his remaining merchantmen already had been withdrawn to home ports. In the three previous months aircraft operating under the Far East Air Forces' organization had searched the seas hour after hour and found shipping targets conspicuous by their absence. The 19-ship convoy was the largest sighted in that entire period. It was a tip that the air blockade was paying off.

Severing of the strait was the latest step in the blockade. The 5th and 13th Air Forces already had squeezed the noose from Formosa south; B-29s from the Marianas had repeatedly mined important mainland ports; rail lines and bridges of the inner China network had been eut by aircraft of the 14th in China and the 5th and 7th from Okinawa; submarine activity and Third Fleet action augmented the campaign. One primary rail line in China had been made impotent by the air blockade around Fusan, Korea; the only other rail line was overtaxed and open to new threats by the Soviet Union's entrance into the Pacific war. Forced to depend primarily on the shrinking resources of his homeland, the Jap was being made ripe for the kill.

Just as the air blockade of Tsushima Strait could be considered only in relation to the campaign against Jap shipping of the last three years, the attacks that were chiefly responsible for its success could best be understood in terms of the planning and effort expended over that period.

The hulks of Jap ships settling to the bottom of Tsushima Strait in late July and early August were grim reminders of another day. Far to the south, left behind in the course of the war, the gaunt black hulk of a freighter continued to rock and roll at the mercy of the waves on a reef off Port Moresby. Her 11,000 tons wouldn't be counted in the tally of Jap shipping lost to air attack in this war. The old ship wasn't even Jap or of this war; she was German and she went down in World War I during a storm.

But the Jap wrecks off Korea and the German wreck off Moresby had this in common. They all had felt the effects of massed .50 caliber firepower coming from fast-flying aircraft skimming so low over the waves they had to pull up sharply on each bombing run to avoid striking the masts of the ships. The ships had been subjected to attack bombing. The reef off Moresby was the Pacific birthplace and practice field, the reef off Korea the latest proving ground.

It is 3,100 miles and three and a half years from Moresby to Korea as an air foree flies in the southwest and western Pacific. Along those miles and throughout those years, Jap shipping has been sent to the bottom with monotonous regularity. (See "Smashing Jap Sea Lanes," July 1945 AIR FORCE.)

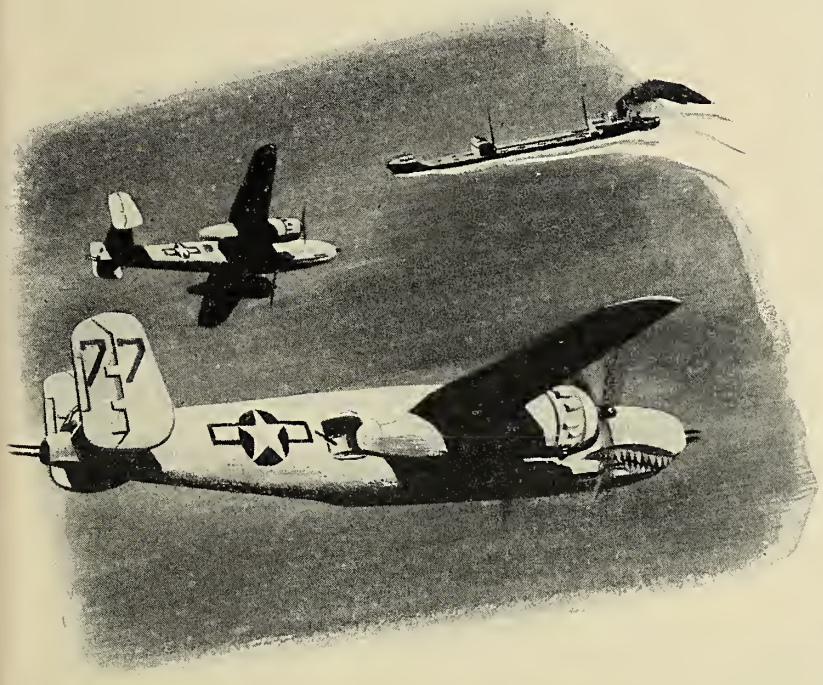
No other tactic has proven so effective against Japanese shipping as attack bombing at extremely low-level altitude. Just as airpower has made possible the overall strategy of General MaeArthur in the Southwest Paeific, on-the-deek attack has been the primary weapon of that air effort. In every major landing operation from Lae to Luzon, excepting only Leyte, attack bombing has been chiefly responsible for knocking out the enemy's air force, isolating the battlefronts, sweeping the beaches clean for invasion and supporting those invasions. And as this method of attaek has been employed day after day in the last three years, statisties have piled up to prove its economies. This is evident in bombing aeeuraey, relative firepower, self-proteetion, increased range, reconnaissanee and flexibility of attaek. General Kenney reports that over a long period, per 1,000 hours eombat flying, attack bombers manned by properly trained crews have had the lowest casualty rate among air units under his eommand.

When bombers of the 5th Air Force began clearing the Tsushima Strait with deck-level shipping attacks, the precision of their tactics was the grand climax of experience dating back to the days of Port Moresby

To appreciate the effects of this technique on the psychology of battle one should see an attack outfit back at base after a good bombing show. There is nothing quite like it; even the fighter crowd can't approach these men in mental attitude. Back at base they are as eocky and arrogant as they are precise and disciplined on the bombing run. Month after month, they do their jobs at wave-top or tree-

top level, break in fast for surprise, turn on the full blast of their forward firing 50s, watch the bullets splatter the defenses, feel the bombs leave the bomb bay and the plane rise sharply, bank and roar from the target and gain altitude, then watch the smoke and flames and debris they have left below. Regardless of how many fast, fleeting moments of action are experienced, the reaction is always the same.

No form of flying provides the exhilaration of low flying. The universal liking among pilots of buzzing the field tells part of the story. Add to that buzzing experience the power of eight forward-firing machine guns and four 500-pound bombs, the coordinated effort that goes with low-level formation flying and synchronized attack and a target staring you full in the face. The spirit of the offensive is built into the fuselage. Self-confidence becomes contagious, runs from pilot to crew to ground men. A bomb run becomes a personal fight, as near as an airman can come to hand to hand combat. There is no cloud bank



between you and the enemy; you are right on his neck, close enough to thumb your nose in his face; most important, you can see the results of your efforts. It's a tough flying assignment, requiring maximum skill and precision work. It takes cocky flying, which sometimes breeds carelessness, but the careless die early and the cockiness matures into healthy self-confidence.

Confidence was sorely needed in the Southwest Pacific back in the early days when the American Air Force, disorganized and beaten, pushed out of the Philippines and Java, struggled to find strength for a comeback from Australia, knowing replacements would be delayed and then would come only in a trickle. The growing defeatist attitude was as much a threat as the Jap. After the forces had been regrouped under Generals Kenney and Whitehead, the latter now Commanding General of the 5th Air Force, the men soon found themselves thinking in terms of the offensive. Not long before, they had been unable to put up an adequate defense. The thinking was along the right line, but it needed tangible results to become a power.

General Kenney declares that the adoption of on-the-deck attack, with its immediate successes, instilled a spirit of offensive that dominated the comeback and the advances that followed.

The basic doctrine of attack was known as early as 1927. General Kenney, then a captain, concentrated on its employment, planned and flight-tested until, he says, "it made sense." In 1928 he was skipping bombs from low level on the range at Langley Field. In that period he wrote a manual on attack aviation doctrine.

The Southwest Pacific was a natural for attack aviation. Weather conditions put a limit on altitude flying, virtually forcing aircraft down to the deck. The large expanses of water offered a smooth surface for low flying. The Jap was located on island bases with set defenses. Plenty of undefended area surrounded each base, an enticing situation for attack bombers that depended so heavily on a surprise approach. The Jap was depending upon his water line of communications and shipping was a vulnerable target for the attack bomber.

General Kenney, an attack aviation man going to an attack aviation theater, came overseas with Maj. Bill Benn, who later became A-3 of Advon 5th Air Force. The two men talked attack bombardment all the way across. In the theater, Bill Benn wasted little time in applying the doctrine to combat. His original application was skip bombing. He worked on the technique—timing, altitude, speed, angle of approach, delayed fuzing — and then selected the harbor of Rabaul for the test. Lt. Robert Herring, now a lieutenant colonel and A-2 of the 308th Bombardment Wing, worked with Benn outlining enemy ack-ack positions, terrain features and radar installations in the Rabaul area. Only B-17s were available for the tests. They were entirely inadequate in forward firepower, lacking in maneuverability. Benn was forced to go in at night in an effort to offset these weaknesses. In three Rabaul missions the skip bombing B-17s, never more than six on any one mission, sank six Jap vessels.

There were many weaknesses, chief among them the lack of forward firepower. The B-25 was the only aircraft-type available for the attack technique. The 25 was ideal in many respects but had only one .50 caliber gun in the nose. Maj. "Pappy" Gunn went to work on the problem and made the original pilot model with eight nose guns—almost unheard of at the time. Problems of balance were worked out and Lt. Col. (now Maj. Gen.) Victor Bertandius took over and remodeled B-25s at Townsville, Australia, to secure the eight forward firing .50s and put the attack bomber on a production basis. Later models of the B-25 and the A-20 carried the nose guns.

Meanwhile the tactical idea prospered. Maj. Ed Larner, then commander of the 3d Attack Group's 90th Squadron, perfected the low-level attack technique until it became a science. The old German freighter on the reef at Moresby offered a natural practice target. Here the 3d Attack Group cut the ship to ribbons and blew it up with practice bombs until coordination, timing and discipline were achieved. The basis of the technique was attainment of complete surprise: the enemy shouldn't know of your presence or even your angle of approach until you were on him and he had felt your guns. Key to success was relative firepower, the ability to concentrate more fire on a target than could be leveled at the attacking aircraft from the target, and thus, in shipping strikes, to beat down the deck defense guns. The kill was administered by bombs released at a specific angle and from a specific distance, the bombs skipping into the side

(Continued on Page 57)

The 73rd Wing became a proving ground for new ideas on B-29 maintenance efficiency, and its accomplishments became blueprints for new Superfort units

First called "the Monstrosity," this crew stand was later made in the States on specifications of the sergeants who built it with parts of a sugar mill.

BIG BUSINESS CAME TO SAIPAN

A business succeeds only when it shows a profit. In order to do that it must make its product available to the consumer at the lowest possible cost to itself. Some businesses—the automotive industry for example—insist on selling their products FOB factory. Others—such as breweries—are satisfied to pay cost of shipping to the consumer. The latter require well organized and economically operated transportation systems.

To be ruthlessly realistic, a bomber is part of a transportation system designed to deliver a product, bombs, to a consumer—the enemy. But contrary to commercial practice, the consumer not only doesn't intend to pay the shipping costs but even tries to prevent delivery. So the producer must pay all the costs until such a time as the investment returns the profits of a victorious peace and assurance of an American way of living.

In the Marianas-based 20th Air Force there were men who dedicated themselves to making that cost as low as possible. And they thought of the cost not only in terms of money but of human lives. They didn't like waste.

It all began with the capture of Saipan in June, 1944. It was the first of the Marianas group taken from the Japs and it was destined to become the home of the 73rd Wing, the first B-29 outfit of the former 21st Bomber Command to go to the Pacific. The 73rd was set up in the conventional manner; it was composed of several bomb groups, each with a companion service group and each containing within itself such services as dispensaries, photo labs, communication systems, transportation facilities and training aids. Based on the assumption that each group would be operating from its own airfield, this arrangement was perfectly logical since experience had taught the wisdom of providing each bomb group with everything it needed to exist independently.

"But on Saipan," said Brig. Gen. Emmett O'Donnell, commanding the 73rd Wing, "it was impossible to operate as originally planned without a tremendous waste of manpower and equipment. We couldn't have done it anyhow because we didn't have the room. You see, Saipan is only five miles wide and twenty miles long and the Wing was expected to operate from one field fitted tightly into one end of the island. Geography created a circumstance with which none of us had had any previous experience. It also created a great opportunity."

It was impossible for anyone to have exact knowledge of Saipan conditions until the Japs had been driven out. The 73rd Wing advance echelon, commanded by Col. Byron Brugge, deputy chief of staff for operations, arrived in August, one month after the island had been declared secure. Wing headquarters, still in the States, was almost immediately informed of the geographical problem. Naturally this information was passed on to higher authority,

In the Build-up Shop mechanics added accessories to engines. Men grew expert at their work on this island production line.

At the Tear-down Shop, parts were removed from used engines that were being sent to the United States for fourth echelon repair. All other maintenance was accomplished on Saipan.

where it was quickly realized that the same geographical problem would exist on the other islands of the Marianas group soon to be occupied and it would therefore be necessary to establish a new maintenance doctrine at command level. Col. C. S. Irvine, later 21st Bomber Command deputy chief of staff for supply and maintenance, was given the task of formulating this new doctrine. Looking back, he said, "We picked the best ideas we could think of from every air force installation we'd ever heard of and added quite a few of our own to create a series of consolidations that resulted in what we think was a new kind of combat maintenance."

Because the 73rd was the first to arrive, it was the first to be confronted with the problems and the first to experiment with solutions. It became a proving ground for new ideas. The first consolidation, actually commenced in the States, was the merging of the maintenance function of the several service groups into two Service Centers—A and B. Then, step by step as the Bomber Command doctrine developed, Engine Build-up, Salvage and Reclamation, Maintenance Transportation and Servicing were taken away from the groups and raised to Wing level. Even Supply was placed under a single supply controller, also at Wing level. Consolidation eventually reached out to the dispensaries, the photo labs, the communication centers, the lead crew and replacement crew training schools.

Now for a look at the results of the 73rd's experiments. Disregarding chronological order, we'll start with Supply because that's where smooth and continuous maintenance really began.

At the outset, when the B-29 was a relatively new weapon, supply officers had little to go by to help them keep their bins properly stocked. Nor was it always possible to control what supplies there were. Many crew chiefs, out of necessity and loyalty to their own airplanes, established their own little hoards of vital parts. To insure proper planning and equitable distribution, the multiple supply depots were consolidated under one supply controller, Col. H. W. Shelmire, and all supplies were distributed between two warehouse areas.

Later, new groups forwarded their requisitions to the warehouse known to stock the item. If the warehouses were out of stock, the supply controller was so informed. Since all requisitions funneled through the office of the supply controller, it was possible to make the studies necessary for constructive planning.

In April, 11,230 items were ordered by means of 4,101 requisitions, 704 of these eventually going to the States. Later, within a 60-day period, there was no knowledge of a single airplane being prevented from flying a combat mission because of an unavailable part. To avoid the dreaded AOCP (airplane out of commission awaiting parts) inventory was made twice a week. And that was a big job when Supply alone stocked 22,475 items.

Many of the items found in the bins of the supply warehouses came from the Salvage and Reclamation Section. Salvage and Reclamation, originally a service group function, was taken from the groups and consolidated into one level section under the command of Maj. Harry C. Weber. Its work started the moment an airplane cracked up anywhere on or near the island. Crash crews stood by during all takeoffs and landings, and removed a crashed airplane from the runway as quickly as possible. Then the airplane was taken to Salvage and Reclamation area and stripped of every salvageable part. These were cleaned, divided into serviceable and reparable categories. Consolidation made it possible to keep one crew working on reclamation projects while another stood by with the crash equipment, something never before possible.

Did it pay? In March, this section turned over nearly $280,000 worth of serviceable and reparable parts to Service Centers. In April, the turnover was $230,000, these totals covering only items for which price lists were available. It also cut off and prepared four CFC center sections, two nose sections and two tail sections for the gunnery school. That was pretty big business.

Consolidation created another big business, the Combat Maintenance Transportation and Servicing Section. Lt. Col. G. L. Hewitt, Jr., the CO, covered the size of it when he said, "We own every vehicle in the outfit." That meant some 2,600 vehicles of all types and sizes. They came from every unit in the organization.

Transportation had always been a problem; everyone complained about not having enough vehicles to meet normal requirements. But consolidation proved this to be a fallacy. The consolidated transportation section managed to keep all the vehicles moving. Sometimes its methods were rather drastic; jeeps, for example, were no longer assigned to individuals on a 24-hour basis except to personnel who presented a letter request proving they were so needed. And only a few requests were granted.

First and second echelon repairs were taken care of by the motor pools still located in the group areas. For third echelon work a new system of maintenance pools was set up. There were four such strategically located pools. Each had a roster of 32 enlisted men and one officer and once again consolidation provided men to do the job. Success was indicated by figures; in the month of April vehicles from this section covered 1,021,362 miles, used 95,214 gallons of gasoline and a proportionate amount of lubricating oil. Its gasoline trucks delivered over 9,000,000 gallons of gasoline to combat airplanes. It kept over 600 ground generating units functioning, the daily average out of commission never exceeding 20. Since inception of this system, the percentage of vehicles out of commission averaged between one-and-a-half and two percent.

The transportation section also was in the manufacturing business. Back in October of 1944 W/O Alexander John Drozynski, at that time assistant group engineer, and Sgt. Archie A. Harrison, a crew chief, started worrying about how they were going to service the B-29s. The plane was larger than any other combat aircraft and very few sections could be reached by mechanics standing on the ground. And the OEL stand which was regular issue was too shaky and provided no freedom of movement. Drozynski and Harrison got an idea and set about to develop it on their own time. They worked nights and days off to build a crew chief stand made to the measurements of a B-29. Using nothing but salvaged material, they finally created a stand 21 feet long, 16½ feet wide and 8 feet high. Even after modification it weighed 6,100 pounds. The two men were ribbed unmercifully, and their dreamchild was called "The

Monstrosity." But it worked; mechanics could run up and down the steps with loaded arms, could get around and under the engines with complete freedom and safety.

General O'Donnell looked it over, decided it had possibilities, gave Colonel Hewitt the job of manufacturing the stand on a production basis. The most difficult problem was to build up a stock pile before going into production. That problem was solved by the fortunes of war. Steel plates and angle irons came from the remains of a Jap sugar mill, frames were built from the tracks of a Jap narrow gauge railroad. Wheels came from wrecked amphtracs and bolts from anywhere, even abandoned ammunition boxes. A regular production line was set up in what was left of a Jap building. The men came from the service groups and had to be completely trained. But within a month they were turning out one stand a day—and it cost the government nothing more than the price of lumber, paint and nails. At first the bomb groups wanted no part of these huge stands, but within a short time they could not be manufactured fast enough to meet the demand. Specifications were sent to Wright Field which immediately let contracts for 120 stands a month to be delivered on a short deadline product basis.

The moment anything happened to a B-29, Salvage & Reclamation pulled the aircraft into their area and stripped it of every available part. Crews stood by for all take-offs and landings.

The first consolidation created Service Center A and Service Center B out of the four service groups. Some of the men gave them the collective name of "Willow Creep." But any organization that covered almost 150,000,000 square feet of floor space with some 40 warehouses, almost 60 shops, a variety of administration buildings, several parachute towers and a couple of service aprons wasn't exactly a "creep." When it used over 700 men and more than 150,000 hours a month it was breaking into a run. And when in spite of an almost 30 percent increase in business it cut down average plane repair time from 10 days to 3.8 days it began to gallop.

All of this was the good fruit of consolidation. Pooling of personnel and equipment saved space and cut paper work in half. Most important was the almost complete utilization of personnel and equipment. Because the problem of maintenance personnel was always critical, a mechanic needed to be a jack of all trades; under the consolidation he could be and usually was a specialist working at the job he knew best. And instead of these specialists being divided among different groups they were brought together in one shop. There were always times when the shops of one bomb group were temporarily idle while those of another were temporarily rushed. With the consolidation all work was distributed equally and usually completed twice as rapidly.

Prop shop, machine shop, sheet metal shop, instrument shop, all the other shops that did their share of keeping airplanes flying were doing a community job and enjoying it. Morale was unusually high because men were doing jobs they knew and were given a chance to finish. And they had the equipment with which to do their jobs because instead of being either hoarded or wasted, it was brought to where it was most needed.

Experience had proven fourth echelon repair to be impractical in a forward area. Therefore used engines had to be shipped to the States for overhaul. It was the removal of accessories from these engines and their replacement on new engines that had made engine change such a slow and tedious job. The Engine Build-up Section provided a new system. Actually there were two sections, tear-down as well as build-up, the first situated in a large, canvas-covered hangar, the second spread over three Quonsets. The used engine was brought to the tear-down hangar, mounted on a dolly that carried it through six stations, each manned by three men performing specialized jobs. For reasons to be explained later, the first was numbered Station Six. Here the generator, starter, vacuum pump and fittings, tach generator and propeller governor were removed. At Station Five, the three man crew removed the accessory case breather nipple, distributor pressure line, supercharger drain line and bracket and so on—until by the time the engine had passed through Station One it was stripped and ready to be pickled and shipped to the overhaul depot. Meanwhile, all usable accessories had been inspected, repaired and transferred to similiarly numbered stations in the build-up Quonsets, where the process of adding used accessories to new engines started at Station One and ended at Station Six. Thus each station here duplicated in reverse the work of the similarly numbered station in the tear-down hangar. And when the engine left the last station it was put in stock.

Improvisation was the order of the day when the 73rd first moved in, and everyone contributed ideas and more than the usual amount of energy. Dollies represented a problem until we began rebuilding them with Jap steel from the sugar mill and bogey wheel from wrecked amphtracs. Stock bins were built, each one in the tear-down section numbered to coincide with a number in the build-up section. These new bins were filled with parts from engine build-up kits taken from new units brought from the States by the B-29s. From then on, they were kept filled by parts taken from engines brought in for overhaul, the only stock shortages resulting from defective parts that could not be built back into the engine. In March this section handled 144,800 parts. According to Capt. Paul M. Lord, they could not function for more than three days without the parts provided by engine tear-down.

The operation grew like Topsy, and the results were beyond expectations. Whereas it had taken 160 man-hours to make an engine change on the hardstand, the job was now being done in an average of 137 man-hours. During periods of maximum effort, such as the March 10-20 incendiary raids against Japan, not one airplane was kept on the ground waiting for a new engine.

That's the way it worked at the 73rd Wing. But each new Wing faced new problems and found new solutions. Sometimes it was not easy to get started, especially where combat servicemen were also called upon to do their own construction. Sometimes, under these conditions, the old crew chief with less men but no less love for his airplane was called upon to perform almost superhuman tasks. And as always before he came through.

Later, Wings still in the States were being organized in accordance with consolidation proeedures evolved on Saipan. When Japan surrendered, the system still had not reached a stage of complete perfeetion and the men were learning new tricks every day. But the job long since had shown fine returns in increased efficiency and economy.—Maj. Milton R. Krim., Air Force Overseas Staff. ☆

Flying Hotel

As the war ended, the AAF's C-99 was being rushed to completion to take its place as the largest of our cargo and troop air transports. This six-engine sky giant was designed to carry well over 200 fully equipped troops or more than 300 litter patients, or to stow such equipment as a 155-mm howitzer and carriage, a 5,000-pound six-wheel truck, even a complete P-47.

Now destined for a prominent role in postwar air commerce, the C-99 will have both "coach" and "Pullman" accommodations for 204 passengers. In addition to regular seating arrangements, the commercial design calls for 9 staterooms and 12 births, accommodating two passengers each, in one of the sections. Two lounges and a number of rest rooms also will be provided.

Built from plans originally drawn up for a mammoth bomber, the C-99 has an estimated range of 4,000 miles and a cruising speed of well over 300 miles per hour. The transport's wing span is 230 feet, more than twice the length of a B-24's wing. Its fuselage length is 182 feet and 6 inches from nose to tail, with a cubic capacity equal to that of about four boxcars. Weighing approximately 130 tons, the C-99 is about 12 times the size of present two-engine commercial air transports.

The plane's six huge Pratt & Whitney engines produce a combined power output equivalent to about 350 average automobiles or four passenger locomotives. The engines drive 19-foot, 4-bladed, pusher-type propellers, a feature which gives the C-99 a distinction of being the first pusher cargo aircraft ever built in this country. The highly swept-back wing, located in the center of the fuselage, supports the six engine nacelles on the trailing edge, permitting streamline effect into the laminar flow airfoil section thus gaining full advantage of the high lift-low characteristics. The C-99 has a tricycle landing gear, the main wheels of which weigh more than five tons. Inside, the C-99 has two decks with linking stairways. It is equipped to accommodate a crew of ten operating in two shifts. A number of telephones connect almost any part of the interior with the flight compartment. Constructed by Consolidated-Vultee, the C-99 incorporates many vital features gleaned from the lessons of war, including latest instrumentation, automatic flight gadgets, lighting devices and electrical systems. ☆

Some pertinent data on the C-99, largest of our cargo and troop carriers

FLYING FOR FUN

100-mission man or groundgripper, you'll need a license to breeze along the civil airways

BY HERBERT RINGOLD
AIR FORCE *Staff*

ILLUSTRATED BY S/SGT. TOM T. BEVANS

"There I was at 2,000 feet. There was no flak. No enemy fighters. There wasn't even a target. ETA? Never heard of it. I just loafed along, playing tag with the clouds. I didn't have a care in the world."

If you've always dreamed about filing a mission report such as this, you're a man who wants to fly a personal plane. You agree the automobile is a great invention, but as far as you're concerned a ride in the old bus can't match the thrill of hopping into a small plane and flying to the mountains for a fishing trip or taking the wife and kids on an outing in the family airplane.

Let's stop a moment. Just because you completed a combat tour that will make your grandchildren think you won the war all by yourself gives you no right to take off in a light plane and buzz around the country with reckless abandon. The long arm of Rules and Regulations still follows you; there are certain operational procedures which you must obey.

Before you can pilot a non-military aircraft, you must get a pilot certificate from the Civil Aeronautics Administration. You may have had thousands of hours in the hottest AAF plane; the Luftwaffe may have voted you The Man We Wouldn't Like to Fly Against Most; your chest may sag beneath the weight of your combat ribbons. That's all very fine but you still must have a certificate. Getting that certificate is easy, and it costs you nothing. This is what you do:

If you are currently on pilot status in the AAF, merely present a certificate of pilot status to any office of the CAA. Or bring along a Form Five—one copy. Imagine. You do not have to bring copies in triplicate, signed by everybody who can lift a fountain pen. You don't have to go through channels, coordinate with higher authority, or effect liaison with proper personnel. One copy will do.

There is only a single qualification you must meet—you must have 10 hours of first pilot time within the year preceding the date of application for a certificate. Only first pilot time counts. CAA won't accept time flown as copilot.

Next comes a short written examination. But don't visualize yourself sweating over a college exam of the type you used to get in Advanced Economics II. The CAA quiz consists of only 25 multiple-choice questions. It covers Sections 43 and 60 of the CAA regulations which deal with general operating procedures and air traffic rules. Officials of the CAA state that any AAF pilot who reviews the regulations should pass the exam without even sharpening a pencil. Copies of Sections 43 and 60 are available from the Superintendent of Documents, Washington, D. C., for five cents each.

That's all there is to it.

You have your choice between two licenses—private and commercial. The principal difference between the two is that a commercial pilot may fly for hire while a private pilot may not. A man holding a commercial certificate must get a physical examination every year; a private pilot takes a physical every two years. But you don't have to go through any further exams to receive a commercial certificate, so you might as well have it. Otherwise, you may have a very unfortunate experience, like that of the former P-47 pilot from the midwest. He figured he didn't need a commercial certificate because he was only going to do a little personal flying, but he made a costly miscalculation.

He was tinkering with his small plane at the local airport when a stranger approached him and said that he had been bumped off the airline. The stranger had to be in another

city late that afternoon and he offered $100 plus expenses for a flight of a few hours. The obliging P-47 pilot is now a groundgripper by decision of the CAA.

All the above information applies to men now on pilot status in the AAF. How about bombardiers, navigators, radio operators, gunners, members of ground crews and non-flying personnel? Also, how about men who were on pilot status but have been discharged from the service?

If you were on pilot status, but have been separated from the AAF, this is the procedure you must follow in order to get a certificate:

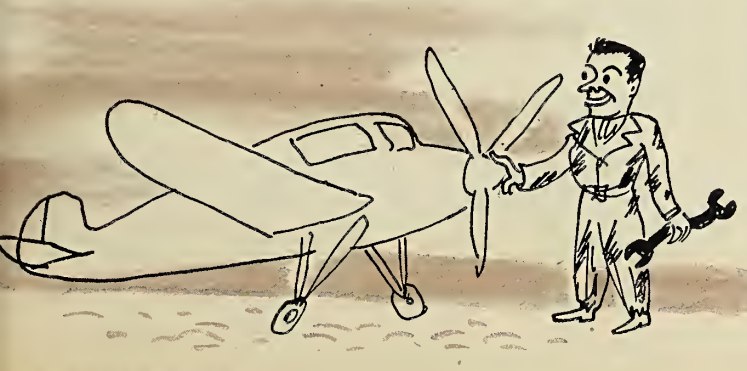
You must present a Form Five or a certificate indicating you were officially on pilot status in the AAF. And you must take a physical. If you want a commercial certificate, you will have to get your physical from registered CAA physicians who are available in almost every city in the United States. The cost is $6.00 and the exam is much less exacting than the Army 64. If you want only a private pilot certificate, however, you can take the physical from any doctor of your choice. Get Physical Examination Form ACA 1345 from the CAA and have your doctor sign it.

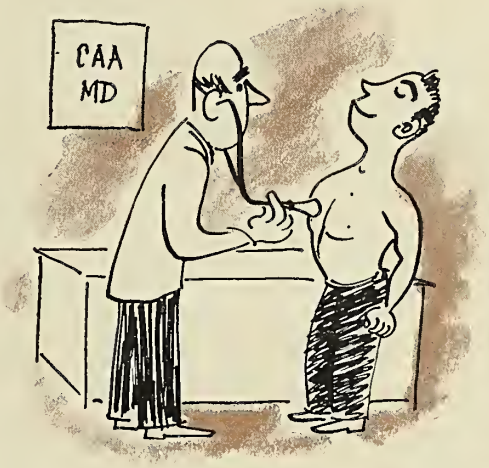
After you present the Form Five or the certificate of pilot status and pass the physical, you take the same written examination given to men on pilot status. Of course, you must show that you have had at least 10 hours of first pilot time within a year preceding the date of your application, and the required total experience.

If you were never on pilot status, this is what you do: To qualify for a private pilot certificate, you must take 10 hours of instruction from a rated CAA instructor and have 30 hours of solo time. Nothing in your past military record will get you out of filling any part of these requirements. To qualify for a commercial pilot certificate, you must take 10 hours of instruction and 200 hours of solo time. Then you take a stiff written exam, consisting of 250 questions on regulations, meteorology, operation of aircraft and the theory of flight and aircraft engines. It is necessary to pass 70 percent of the questions in each category.

Consider the sad plight of a B-24 navigator from one of the hottest groups in the ETO. He always wanted to be a pilot, and during the practice runs over England, he sat in the copilot's seat and took lessons on how to fly an airplane. Returning to the States, he received further instruction from a rated CAA instructor. By the time he finished, there was nothing he couldn't make an airplane do. But he made the grave error of figuring that his military experience would be sufficient to get him by the written examination. He was a hot rock on reading drift but he never heard of the CAA regulation governing the proper approach to an airfield. Result: He flunked the exam. Moral: Knowing how to fly is not enough. You must pass the quiz. Any office of the CAA will provide a booklet which outlines the material covered in the examination.

The following information applies to all men who make application for a pilot certificate: There are two additional steps you may take if you desire. They are *not required.* But if you expect to fly under instrument conditions you must have a CAA instrument rating. And if you expect to give flying lessons to students who want to receive CAA credit for that instruction, you must become a rated CAA instructor.





CAA instrument ratings are available in two ways. If you have a green card from the AAF, you will be given a CAA instrument rating without further examination. Without that green card, you must pass a written exam and a flight test.

The written exam for an instrument rating consists of 90 questions, divided into three parts of 30 questions each. The first section deals with CAA regulations regarding instrument flying; the second covers meteorology; the third consists of questions on orientation and operating procedure. Each section of 30 questions must be passed with a rating of at least 70 percent.

After you have finished the exam, you take a flight test on an airplane which you must provide. The plane must have dual controls, adequate instruments and a hood. It is important to note that this test is given on the primary instruments only. This means that if you are used to flying the full panel system, you'll have to review the technique of flying by needle, ball and airspeed.

If you want to be a rated instructor, the following rules apply:

You must take a written examination of 200 questions. One hundred questions deal with the fundamentals of instructing, and the rest are on the analysis and performance of flight maneuvers. It is necessary to get 70 percent on each 100 questions in order to pass. Then a flight test is required. Again, you must provide an airplane which has dual controls, and you must perform ordinary maneuvers to the satisfaction of your examiner.

The CAA points out that while its examiners may be impressed with your ability to do an inside loop in a P-38, such aerobatics will do you no good as far as getting an instructor's rating is concerned. In light plane operations, you will have to be content with engines that develop considerably less horsepower than those in the military plane you've been accustomed to flying. The CAA is not only interested in your ability to fly; it is concerned with your ability to fly *safely.* Most CAA examiners are grey-haired veterans who trust you remember the old adage about old pilots and bold pilots.

The regulations mentioned cover all AAF personnel except liaison pilots and glider pilots. Liaison pilots may receive a private certificate by fulfilling the general regulations, but in order to get a commercial certificate, an "L" pilot must show he has 200 hours as a first pilot, accumulated after he received his rating as a liaison pilot. Glider pilots must show that they have 200 hours as first pilot on a

(Continued on Page 61)

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BALIKPAPAN

Major victim of the air campaign against Jap oil

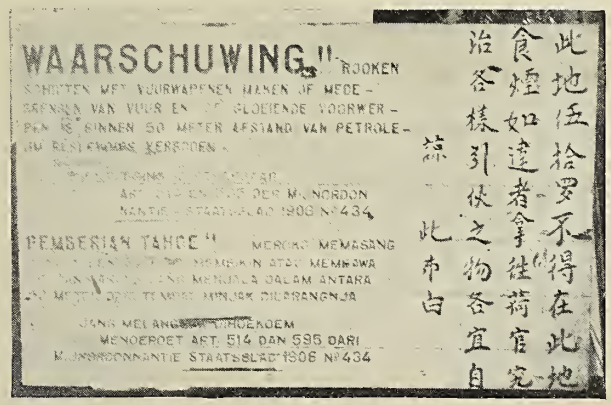
BY SGT. JULIUS J. SPECTOR

Germany lost oil and lost the war. Japan learned, too, that the sequence was inevitable. Weeks before final surrender, the Jap's once well-oiled war machine had almost run dry. The reason, as it was in Europe, was a strategically-calculated campaign against enemy oil centers. As in Europe, the campaign was waged almost entirely from the air.

Major oil center to be knocked out in the Pacific was Balikpapan. It had to be first. Other oil targets may have been important from a long range viewpoint, but Balikpapan was the principal, and often exclusive, source of petroleum for the enemy's daily operations in the Southwest Pacific. Balikpapan's annual output of 3,000,000 barrels went directly to the Jap's tactical bases, supplied his navy, merchant marine, aircraft and motorized equipment from the Carolines to Rabaul, and serviced points farther north, including the Philippines and the homeland, and the Netherlands East Indies to the south.

The storage and refining center of Balikpapan was built by the Dutch near the rich oil fields of Borneo. The Jap took Balikpapan early in the war and was certain he could hold it, felt secure in its location and in the strong defenses he placed there. But he underestimated, or couldn't comprehend our capabilities in the air. By the time he learned, he was powerless to do anything about it.

←Gaunt monument to airpower is wreckage of a Balikpapan paraffin plant smeared in strafing and skip bombing attacks by 13th.



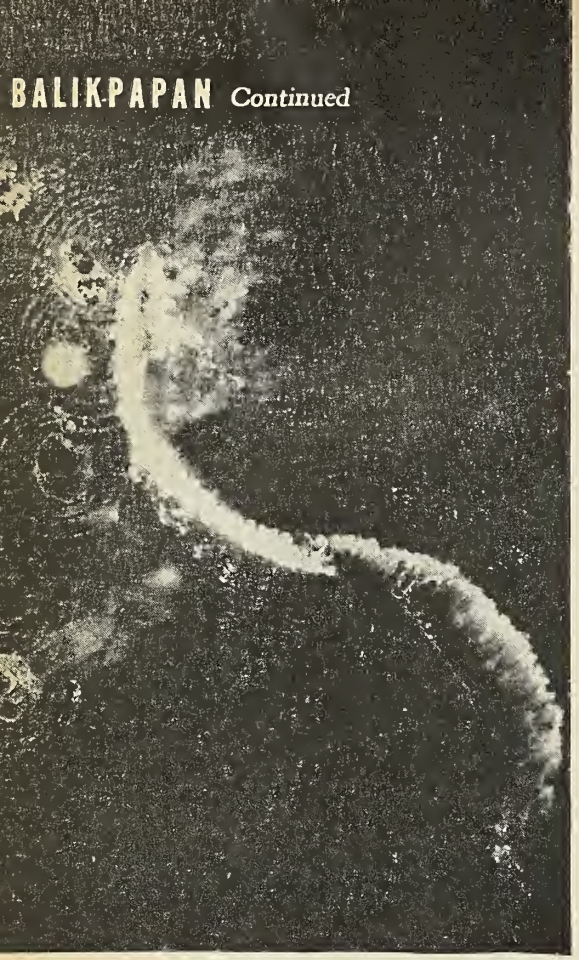
This Jap sign stood outside a Balikpapan refinery, threatened severe punishment in three languages to anyone bringing fire near the plant. The 13th Air Force ignored warning.

The air campaign against Balikpapan began in August, 1943, when B-24s of the 380th Bomb Group, under direct operational control of the RAAF, struck from northern Australia in a series of three hazardous 2,700-mile missions, the longest attempted in the SWPA up to that time.

Later, the job was turned over to the 13th Air Force, which had moved up from the Solomons to Noemfoor. Elements of the 5th Air Force participated in initial attacks against Balikpapan from Noemfoor, and the RAAF attacked its shipping and later supplied close air support during its invasion. But the campaign against Balikpapan was essentially a 13th Air Force show.

Opening the campaign from Noemfoor on September 30, 1944, the 13th flew two 2,600-mile round trip missions without fighter cover, and paid a relatively high price. The third mission went out with fighter escort in a surprise attack. By the end of the sixth major blow, the 13th had knocked out two Balikpapan refineries. Then the Philippine campaign intervened, and Balikpapan had a long breather while the 13th helped support land action in Luzon, the Visayans and Mindanao. Early in 1945, Balikpapan again came up on the 13th's schedule — this time for keeps.

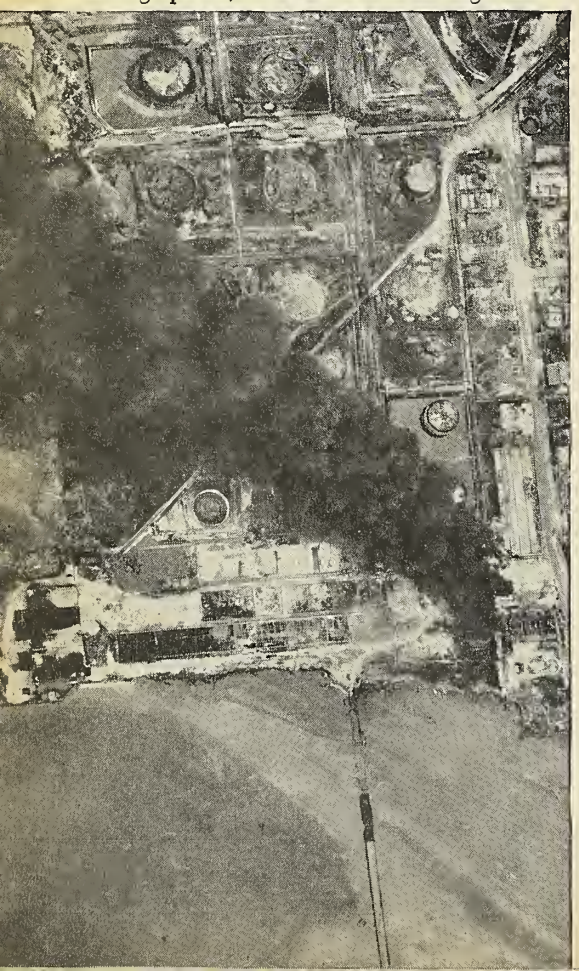
From the opening attack to the July 1 F-day attacks from bases closer to the targets, the 13th flew more than 2,300 sorties against Balikpapan, smacked the oil center with more than 3,400 tons of bombs. Photographs on the following pages tell of how the air campaign wiped Balikpapan off the target list and off the Japanese map.



Evasive action did not save this Kongo-class battleship in 1943 from bombers which scattered convoy while attempting oil blockade in Borneo area.

Complete blockade was impossible. The search area was too great. Balikpapan had to be knocked out from air. At first it took long, unescorted missions; then came fighter cover, low-level attacks and, finally, air coordination with ground invasion forces.

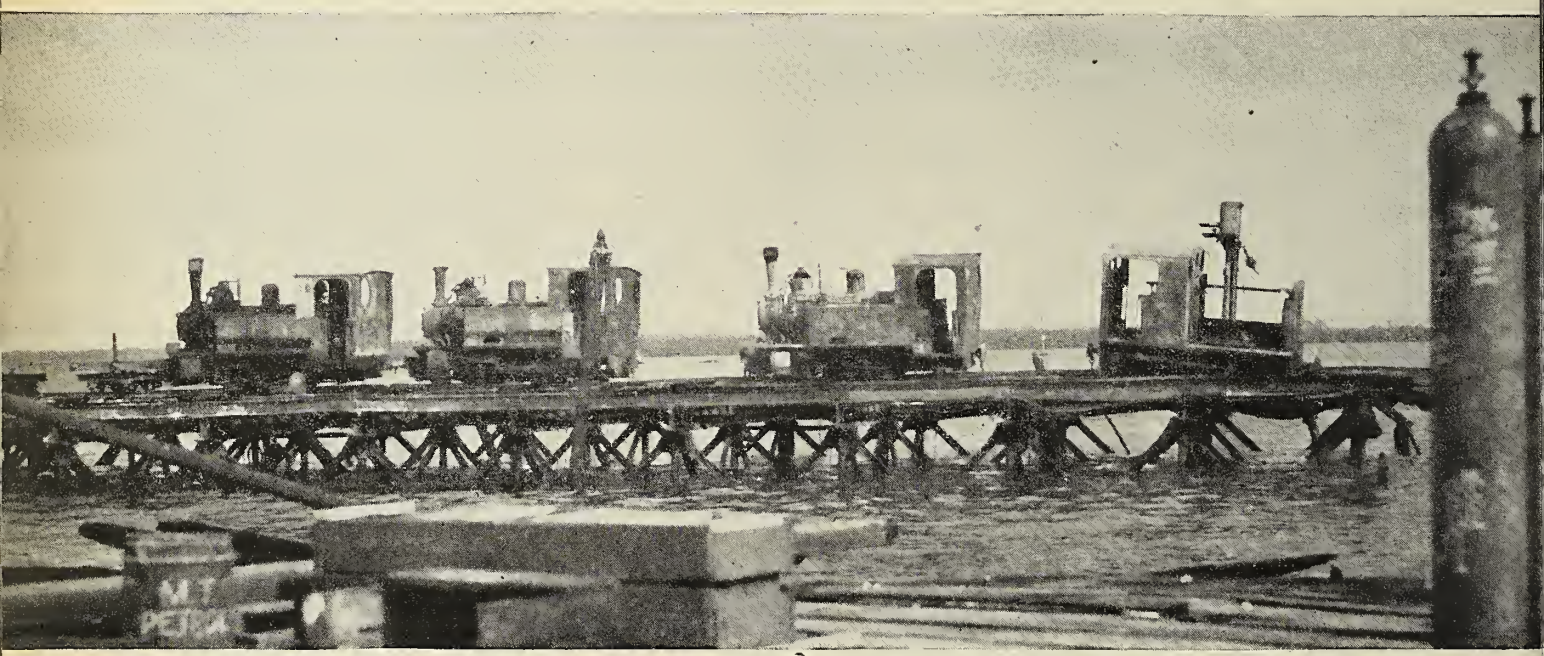
Balikpapan's objectives were attacked in their order of importance. First came refineries and cracking plants, then vital oil storage tanks.



Hottest target east of Singapore, Balikpapan was first defended in the air, but Jap fighters fell victims to attrition. Scores of guns like this 127-mm dual-purpose naval weapon also attempted to repel our air assaults in the months before Allied invasion.

Napalm bombs made of jellied gasoline composition were dropped on Balikpapan. Outlying rail junctions, jungle storage areas and Japanese troop outposts like this flaming garrison were given the heat treatment by low-flying planes during the closing stages of the air campaign.

Inland supply lines, vital to the enemy's oil reserve, received careful and continued attention from the B-24s. Bridges necessary to the Japanese transportation network were prime targets throughout the campaign and scenes like the above became common toward the end.



These "Toonerville" engines are part of the Japanese railroad rolling stock which was used to bring oil to the docks of Balikpapan, there to be delivered to tankers for transport to areas of Jap navy and air operations. Bomb hits on the trestle left these locomotives "at sea."

This cross-section of martial Swiss cheese is actually the airfield at Manggar, in the Balikpapan area. Allied planes reduced the enemy's ability to fight back by battering airdromes continuously. Enough explosives scored direct hits here to create a constellation of craters.

Invading troops of the Australian 7th Division landed near Balikpapan at 0855 hours, July 1. Impeded by static beach obstacles but facing no troop opposition due to pre-invasion bombing and strafing, the battle-seasoned forces quickly secured their vital beachhead.

Seppingang airstrip was captured after a prolonged struggle. Aussie engineers had it ready for use on F plus 14. The first plane to land was this 13th Air Force Catalina.

Aussie aircraft controller directed the air support and the 13th coordinated the action.

Refineries which had been converting the crude oil into fuel for the day to day Japanese operations were bombed to rubble by air attacks.

Bombed and burned oil tanks sprawled in hollow shapes throughout Balikpapan fields, breaking the link between wells and refineries.

These factories stand gutted by flames, and black clouds of smoke still rise a week after the bombers had completed their mission.

This scene of desolation, with its battered factories, twisted precision machinery, reveals part of the havoc wrought at Balikpapan.

OUR POWER TO DESTROY WAR

(Continued from Page 10)

What are we going to do?

At the moment, we are bending every effort and we have every hope that the United Nations can and will work out a system for maintaining the peace which will make it impossible for an aggressor to arise. It should be remembered that these present and probable technological developments which would be so deadly a peril to us if we let our present preeminence in the field go, and, neglecting our safety, remained indifferent while a potential aggressor outstripped us, are also the means by which the rise of any such aggressor could be made almost impossible.

If it is objected that we are not yet certain that the United Nations Charter or any other international instrument will really work, that is, of course, true. The point is that, basically, the means by which we hope to make the United Nations Charter work are also the means by which we will have to safeguard our country if the United Nations Charter does not work. We are now the most powerful nation in the world. Our possession of power, which, in a just proportion, we can make available to the United Nations in the maintenance of peace, is the best guarantee of maintaining this collective peace. If the nations of the world find that they cannot act in concert, our possession of power will be our only resource. Therefore, we must at all costs maintain it.

What do we need to maintain it?

I will start by emphasizing that I am not holding any brief for a permanent air force. Maybe we will find that we don't need any air force in terms of the mighty air forces we built up during the war. What we will need is an adequate, well-trained, fully-equipped force of whatever kind is necessary to use the new weapons and devices properly.

I believe that we will need a system of universal military training which can back up this force, whatever its name or nature, with a constantly renewed reserve available for rapid expansion in an emergency.

Most important of all, we will need an ably staffed, adequately financed and properly equipped research and development program. I say, most *important of all*, because if we fail to keep not merely abreast but ahead of technological development, we needn't bother to train any force and we needn't make plans for an emergency expansion; we will be totally defeated before any expansion could take place.

An effective research and development program involves an intricate and complicated organization. The accompanying chart shows the movement of research requirements through the Air Force organization and through the civilian agencies helping us with our developments. From it you may get some idea of the endless study and testing and checking, of the huge laboratories, the great testing grounds, the thousands of highly skilled personnel, which comprise our present program of research and development.

All this is expensive, of course, but I wish to assure you as earnestly and forcefully as I can that it is one expense that we must not now, or ever, skimp or stint. It is the price of security and the price of peace.

As I see it, this is the hope for the future. The new weapons, the atomic bomb and so on, are terrible and terrifying only if we assume that they must fall into the hands of men, like those leaders of Germany and Japan now defeated, who seek not peace, but plunder and world domination. I do not believe that they must fall into such hands.

I think we can, here and now, make those wise decisions which will keep these terrific forces as the bulwark of a just and equitable world system. The power which lies in them, great enough to destroy civilization is great enough, if we use it rightly, to destroy war. ☆

AIR FORCE MAGAZINE — CAPT. BILL LENT

RENDEZVOUS

(Continued from Page 3)

a bunch of random Troop Carrier planes and crews and an assortment of first lieutenants, PFCs and limited-service combat personnel. There were squadron leaders and flight lieutenants and South African captains there, too.

There are lots of interesting things about MATS. It was not a perfect Allied organization, but it was the only Allied group I know that functioned with maximum efficiency and minimum nationalism. I, as an American officer, was proud that MATS was allied and that American, British and South African crews flew our regular routes. I was proud that in my own (Constantine, Algeria) area, British and American transport officers worked in harmony to expedite passengers and cargo regardless of nationality.

I was proud of the officers and men I was associated with in MATS. They started air terminals at Oran, Algiers, Constantine, Bizerte, Tunis, Palermo, Catania, Naples, Foggia, Bari—and many other places—from scratch, without adequate supplies and with no authority other than their own American ingenuity and good will which secured cooperation from whomever they contacted. They talked the Service Command into supplying men, miscellaneous supply depots into giving them materials, British engineers into giving them labor. I was and still am proud of working with those men, even with the Italian POWS who were so proud to work for us. . . .

1st Lt. Paul C. Kell,
556th AAF Base Unit,
Long Beach, Calif.

The Real Father

Dear Editor:

Realizing that it was not with malice aforethought nor arbitrary omission on the part of AIR FORCE's editorial staff, we attribute your failure to mention the name of the real father of the frangible bullet in the April issue to a lack of information on the subject.

We in no way wish to discredit the work of AAFTC, NDRC and ATSC because without them the project would not have reached fruition, but on the other hand, had it not been for Maj. Cameron D. Fairchild, who conceived the idea at Laredo Army Air Field over two years ago, there would not have been any project.

1st Lt. J. Eugene Hoover,
Laredo (Texas) Army Air Field.

Long Reach

Dear Editor:

I beg to differ with a statement made in the article "Scandinavian Carpetbagger" published in the August issue of AIR FORCE. Statement in question: "The flight from Britain to the drop zone and return covered more than 2,600 miles and took 16½ hours. It was probably the longest combat mission ever flown in the ETO."

During the summer of 1943, while stationed at Port Lyautey, French Morocco, the 480th Antisubmarine Group carried out

(Continued on Page 61)

News and Views around the World

CROSS COUNTRY

Under the Eiffel Tower—

a kid smiles up into a bomb bay—

and a veteran Fortress shows off.

AAF's Paris Exposition

Officials of the underground railway system telephoned on the second day of the U. S. Army Air Forces Exposition in Paris. They wanted to know how long the exposition was scheduled to run, explaining that they had already found it necessary to provide extra trains to handle the crowds.

Thus was the spontaneous reception accorded the exposition by Parisians, who welcomed a chance to see at close range the airplanes the Americans had used to throttle German industry, shatter communications, deplete oil production and furnish air cooperation for ground troops.

Never before has any foreign population been afforded an opportunity to see the components of American air might on such a grand scale. Under the famed Eiffel Tower Frenchmen, as well as thousands of ever-curious GIs, could see 18 types of aircraft—Flying Fortress, Liberator, Thunderbolt, Mustang, Lightning, Black Widow, Marauder, Havoc, C-47, C-46, gliders, Cub-scouts—virtually every type of operational plane used in our air war against Germany.

Wooden stairways were built to wind up and around most of the planes. Pictorial exhibits, consisting of huge blow-ups with French texts, told the story of strategic bombing, tactical operations, the troop carriers, the transport command airways communications, aviation engineers, air defense organizations.

Parisians loved it. They came by the thousands. On Sunday, August 5, an added thrill was advertised—an air show of Fortresses, Marauders, Mustangs and Thunderbolts. Thrill-seekers jammed the 300,000 square feet of the exposition grounds, a crowd estimated at 130,000 when the planes arrived overhead. The situation became so chaotic that the MPs had to close the gates until some of the spectators departed. At the end of the first week 450,000 had seen the show, this figure jumped to a million at the end of 18 days.

Lt. Gen. John K. Cannon, commanding U. S. Air Forces in Europe, opened the exposition at a special preview July 31 on the eve of Air Force Day, 38th anniversary of AAF. Dedicating the exposition to the French who saved thousands of American flyers, General Cannon said: "Nobody can place a value on the lives they saved. From a military standpoint alone, the rescues were of great importance to us. This work was so dangerous that the average span of life of the leader of one of these underground chains was eight months. These were French men and women fighting and dying for their country, and, in doing so, giving immeasurable aid to America and the cause of freedom. They were soldiers in the finest tradition. We shall never forget them." Other speakers included U. S. Ambassador Jefferson Caffery, Georges Bideault, French Foreign Minister, and General Gene Bouscat, French Air Forces commander.

The planes, most of them battle-weary, were of greatest interest. But not far behind were the free movies offered in the Butler portable hangar built by the Engi-

neers. There combat films furnished by the 8th and 9th Air Forces, and features such as "Memphis Belle," and "Fight for the Sky," were exhibited. Other displays of special interest included a buzz bomb model, massive searchlights, Norden bombsight, air-sea rescue equipment and gaudy parachutes which draped the Troop Carrier section.

Sixteen-page souvenir booklets with French and English texts were given away at the rate of 15,000 daily.

Newsreels, radio and press notices spread the fame of the exposition, and it became a "must" for most visitors to Paris during August and September. Army Air Forces officers from the MTO came to see it, and went away with plans to duplicate it in Rome. Plans also were underway to produce expositions in Copenhagen, Oslo, The Hague and possible other European capitals. The exposition was conceived by Office of War Information, which planned and produced it in close cooperation with all air components in the European Theater.

Low Roll

We could exercise a healthy doubt toward this following item, except that it comes to us from a source that has always been sober and reliable. It seems that a 5th Air Force B-25 weighing 28,000 pounds, loaded with four 250-pound bombs, flying at 150 feet at an indicated airspeed of 240 mph, completed a snap roll and its crew lived to tell it.

Piloted by 1st Lt. George Ellis, this plane was flying in No. 2 position in "A" flight of a six-plane squadron formation. The target was a railroad marshalling yard on Formosa. Nearing the target, the formation was descending to tree-top level for the bombing and strafing run. An object, unidentified but believed to have been anti-aircraft shell, hit the nose-wheel compartment of the B-25, causing the nose-wheel door to fly open. This sudden interference with the normal air flow threw the plane upside down. The nose-wheel door was blown off. Reacting properly, Ellis pulled the stick back and held the right rudder with the roll. The plane leveled off about 10 feet above the ground.

Ellis then took a position in another squadron of his group and completed the bombing and strafing run. The bombs fell on the target and the pilot took his damaged Mitchell back to base.

When they landed, Navigator Bruce C. Currie climbed out, and grinned at Ellis. "Do that often?" he asked.

High Scoring

Recent tabulations indicate that final accounts will list the 9th Air Force's 354th P-51 fighter group as the top scorer in aerial kills for the European Theater of Operations. When the "Pioneers" knocked down 157 German aircraft in aerial combat during the last 60 days of the war, they boosted their total to 701 planes, plus 256 on the ground.

The ratio of the 354th group's victories against their losses indicates a score of better than five to one over their German

PLANE BONERS

Analyzed by Veteran Pilots

MEDIA, PENN.—A flight officer bluffed an operations sergeant into giving him a local flight clearance for a BT-13 after he was told by the operations officer that the plane wasn't available. The pilot took off and violated regulations by going outside the local flying area to the vicinity of his home at West Chester, Penn. According to the pilot, the engine began running rough about this time and he landed successfully at a golf club, but the right wing struck a pole. Later a take-off was attempted but the engine quit and the trainer settled back to the ground, rolling until it hit uneven ground where the landing gear collapsed.

Comment: This fellow may be able to fly an airplane but he certainly isn't a qualified pilot. He asked for the book and almost got it. For his unauthorized flight and other breaches of rules, a general court-martial socked him with $75 a month pay forfeiture, three months restriction to post and suspension from promotion for one year.

FT. SUMNER, N. M.—P-47D was taxied into take-off positon, throttle opened and take-off run started. At 150 mph with the tail raised the pilot could not get the plane in the air. Full throttle and back pressure on the stick was tried without any change in results. Pilot cut switches as he was nearing end of runway and groundlooped.

Comment: Pilot did not have his trim tabs set correctly for take-off. Be careful in using trim tabs—they are extremely sensitive. It is difficult to overcome the tremendous pressures exerted by improperly set tabs.

FORT MYERS, FLA.—Flying at 5,000 feet in a B-24H, the pilot found the controls jammed, making it extremely difficult to move them backward and elevate the nose. The pilot returned to his field and, luckily, accomplished a landing without damage to the bomber. Check of control cables revealed that a strap on the engine covers stowed in the rear part of the fuselage had become lodged between the automatic pilot servo unit and the elevator control cable pulley.

Comment: Correct stowage of engine covers is on the upper deck of the rear bomb bays.

HIGGINSPORT, OHIO—After flying an A-20 on a ferry flight for 20 minutes, the pilot tried to orient himself by radio. The radio equipment was inoperative. Various headings were flown without success. Pilot claimed poor visibility prevented pin-pointing position through visual checks. After flying more than three hours, fuel became short and a forced landing was made on a highway. Check of the plane disclosed that the gyro compass processed excessively. Records indicated it hadn't been swung for four months. The radio compass was inoperative and reception by the command radio was poor. The airplane had not been flown for almost two months and had not been checked by an engineering officer prior to flight. There was also a 100-hour inspection due. The pilot had not been instructed in the type of flying done in the United States by ATC and had not been instructed in the use of the A-20 radio.

Comment: Luck is a good thing to have, not to depend on. Don't fly flights you aren't qualified for in an airplane not in safe flying shape.

SAVANNAH, GA.—Turbo boost was lost on No. 1 engine on a B-29 while on cross country flight. Black streaks began coming from right accessory door, increasing in frequency until, while on downwind leg during landing, No. 1 engine burst into flames. CO_2 bottles were discharged, the prop feathered, and the fire was put out by field equipment after landing.

Comment: This fire was not fault of engine but of ground crew. It was caused by exhaust gas escaping from the second flexible joint ahead of the supercharger. Three bolts were missing from the chevron clamp that holds the flexible joint to the collector ring, and the fourth bolt was loose. Nuts were not safety wired.

FORESTVILLE, MICH.—P-47 student pilot made a few passes at the target while on a gunnery mission and then noticed that his rpm was fluctuating, first overspeeding and then dropping to 1,500. Pilot put prop in manual position and tried to advance his rpm but fluctuation continued. Pilot made a forced landing.

Comment: Check disclosed that the auxiliary tank, C and D chambers of the carburetor and the main fuel line from the fuel selector valve to the engine fuel pump were dry. No malfunction could be found. After exhausting fuel supply in auxiliary tank, the pilot believed he had a runaway prop and, concentrating on this alone, forgot to change to the main tank.

PREPARED BY THE OFFICE OF FLYING SAFETY

QUESTIONS

on Policy and Procedure

Q. Must National Service Life Insurance be converted to ordinary life, 20-payment or 30-payment life within five years?
A. *Under a new law recently signed by the President, reconversion is not necessary until eight years after the date the policy was issued.*

Q. Is it proper to make an entry in the forwarding indorsement in the Service Record of the fact that the soldier was favorably or unfavorably considered for the Good Conduct Medal or Clasp upon transfer?
A. *Upon transfer, a statement with date that the enlisted man was considered "favorably" or "unfavorably" for the Good Conduct Medal or Clasp will be made under "Remarks—Administrative." (Par 66v (7), TM 12-230, 18 October 1944.) There is no authority for making this entry in the forwarding indorsement.*

Q. May wives of officers overseas belong to officers' clubs at bases in the area where they reside?
A. *AAF Letter 35-103, 13 June 1944, states that it is desired that necessary steps be taken to provide that the wives of AAF officers, warrant officers, and flight officers, whose husbands are permanently assigned to overseas duty, be afforded the privileges of such officers' clubs (or officers' messes, in appropriate cases) within the vicinity in which they reside, upon their payment of dues at a rate determined by the club council, but not in excess of that which would normally be charged their husbands were they members of such clubs.*

Q. What disposition should be made of soldier's pay data cards (WD AGO Form 28) now in the possession of enlisted persons in the United States who are not alerted for oversea service?
A. *In the case of an enlisted person in the United States who is not alerted for oversea service, the pay data card if in his possession will be filed with the Service Record for reissuance if such person is later alerted for oversea service. This is not meant to imply that each enlisted person must have a pay data card, but provides for the disposition of the card when an enlisted person in the United States not alerted for oversea service has one in his possession which was prepared under previous instructions. (Par 13g (1), AR 345-155, C 1, 14 June 1945.)*

Q. If the wrong date of birth is entered in a Service Record, how may it be changed?
A. *Pursuant to AR 345-1, authority is delegated by AAF Ltr 35-2, 15 May 1945, to commanding officers of all AAF installations to change the record of the name, date of birth, or place of birth of an enlisted man or woman while in active service. After final action has been taken to change the records, all supporting evidence will be forwarded, as required by AR 345-1, direct from the commanding officer making the change in the record to The Adjutant General, without reference to Headquarters AAF.*

Q. Must every organization maintain a duty roster?
A. *AAF Ltr 35-37, 16 December 1943, delegates authority down to the station level to dispense with maintenance of the duty roster in those specific installations, organizations, and detachments where maintenance of the duty roster serves no useful purpose in effecting daily assignment of personnel to housekeeping details.*

Q. What is the time limit for submitting claims for reimbursement for travel performed by dependents of military personnel on permanent change of station?
A. *Claims for reimbursement for travel performed by dependents of military personnel shall be forever barred unless such claim, bearing the signature and address of the claimant or an authorized agent or attorney, shall be received in the General Accounting Office within 10 full years after date such claim first accrued: Provided, that when a claim of any person serving in the military or naval forces of the United States accrues in time of war, or when war intervenes within five years after its accrual, such claim may be presented within five years after peace is established. (Section I, WD Bulletin No. 33, 9 November 1940.)*

Q. May a creditor file claim against National Service Life Insurance payments to the beneficiary of a soldier killed in action?
A. *No. NSLF policies cannot be attached for debts. (Note: This is also true of Soldiers' Deposits. Though deposits and interest are exempt from liability for debts they may be applied to the satisfaction of indebtedness to the Government, if authorized by the enlisted person.)*

PREPARED BY THE OFFICE OF THE AIR INSPECTOR

opponents, and most of the group's major air battles were fought against odds that great. The biggest day in the history of the unit was August 25, 1944, when its pilots accounted for 51 enemy aircraft and broke four fighter records. On that day the group became the first to pass the 500th mark in less than nine months of combat and to take such a toll of enemy aircraft. Thirty-eight of these were aerial kills and 26 were accomplished by one squadron.

Final group totals show that the 354th, now commanded by Lt. Col. Jack T. Bradley, destroyed or damaged 6,804 locomotives, 3,034 military trucks, 150 armored vehicles and tanks, 5,282 railroad cars, 834 buildings, 55 bridges, 112 gun emplacements, 15 gas or oil dumps, 37 hangars, made 245 railroad and 76 highway cuts, and killed 500 enemy soldiers while spearheading Third Army drives with attacks on German airfields, marshalling yards, towns, communications and supply lines.

Movement through Meeks

On a map of the North Atlantic, the little shape of Iceland hangs like a bat from the Arctic Circle. It is 1,500 miles from Labrador, 850 miles from Scotland. Since the establishment of the ATC's big Meeks Field, this strategic spot has been called the stepping-stone between hemispheres, an aerial cross-roads of the Great Circle route.

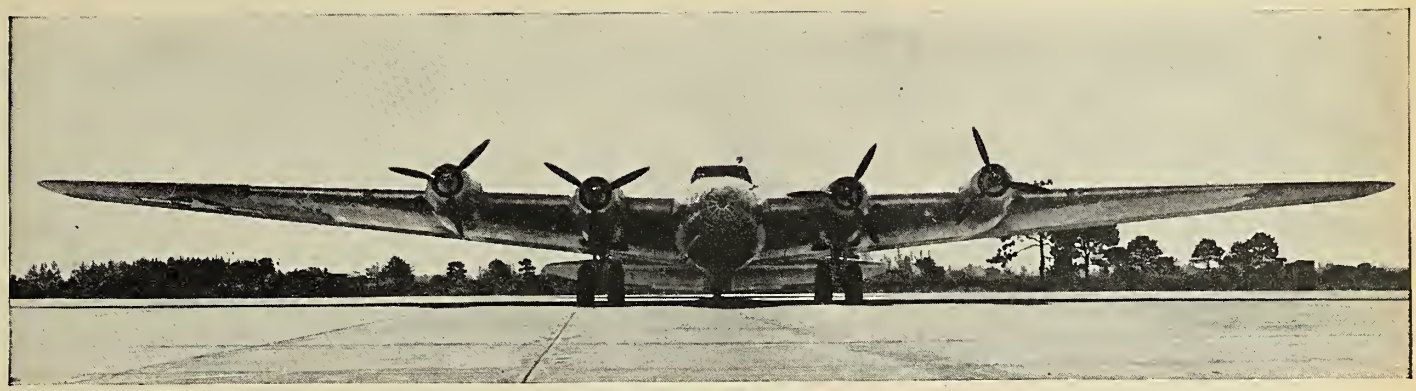
Men of the ATC permanent party call it "The Rock." They call themselves the Forgotten Bastards of Iceland and issue, with proper ceremony, certificates to all men who have endured the requisite period of 101 days in Iceland.

Iceland is roundly cursed by permanent party and transients alike on account of its weather. It was rough as a cog in the early days of Meeks and some of the personnel had to live in tents. At one time a gale reached 130 mph and five men were killed. On several occasions no one was able to go back and forth between the offices or reach the mess halls, and now it is a rule that during high winds men must never go outdoors singly.

Meeks' four 6,000-foot runways were hacked out of stubborn terrain, and perhaps only the coolie-built B-29 bases in China were a more difficult chore to construct. At the opening ceremony in March, 1943, the field was named in honor of the first American casualty in Iceland, Lt. George B. Meeks, P-40 pilot, who died on patrol April 19, 1941, when his plane crashed into Reykjavik Bay. The full name of Meeks Field, commanded today by Lt. Col. Ronald C. McLaughlin, is 1386th Army Air Forces Base Unit, North Atlantic Division, Air Transport Command.

Soldiers flying by way of Iceland in the mighty eastbound armadas, and more recently on the great westbound movement, have often been weathered in from two to ten days at Meeks Field which is located in southwestern Iceland, near the fishing village of Keflavik and 35 miles from the capitol city of Reykavik.

Due to the swiftness with which good flying weather sometimes follows bad at



Very honorable discharge.

Meeks, transients are not allowed to leave the field, with the result that thousands upon thousands of military birds of passage know nothing of the island beyond Meeks' runways, mess halls and billeting huts.

This has been a misfortune attributable to the exigencies of war. If it had been expedient to allow transients to leave Meeks for a good look around, they would have discovered that despite the gales, williwaws, fogs, drizzles and general cussedness of the weather, Iceland is an interesting and often pleasant place. It is not cold and snow, but rather gales, fog and humidity that make Iceland weather so villainous. Due to these conditions visibility can close down from adequate to zero while a bomber is making its final approach to the field. Yet, there are also days when the air in Iceland is perfectly clear. Such times are idyllic with yellow sunshine, green grass, blue water and magnificent cloudscapes.

The record of both Iceland and Meeks Field in World War II has been brilliant, especially in the establishment in England of the scores of AAF bombardment groups and, later, their redeployment. Here is an initial summary of Meeks Field's record as of early August:

Total aircraft handled—13,500 (eastbound 7,300, westbound 6,200).

Total personnel transported in these aircraft 174,000 (eastbound 55,000, westbound 119,000, including 20,050 wounded). Thousands of tons of cargo and mail also were aboard the planes. The Iceland route for four-engine planes called for stops at Presque Isle, Maine; Labrador or Newfoundland; Meeks; Valley Wales, or Prestwick, Scotland—and vice versa. Two-engine aircraft added Blue West One, ATC's field in southern Greenland.

Breaking down the overall figures a bit:

Of the 7,300 eastbound aircraft that roosted at Meeks during the great flow to the ETO in 1943-44, 6,800 were tactical—B-24s, B-17s, B-26s, A-20s, and even a few P-47s with belly tanks. The other 500 were transports—C-54s and C-46s.

Transports (3,600) outnumber tactical aircraft (2,600) in the westbound total. This is due to the Green Project which calls for the movement of men from the ETO to America and separation. Early in August 54,000 Green Project men had passed through Meeks. In the White Project, which the redeployment of the 8th and 9th Air Forces was called, more than 2,000 four-engine bombers, loaded with 20 men each, and nearly 500 two-engine, with 13 men aboard, had moved through the field.

Then, there was the Eversharp Project, the movement in May and June of 62 generals with entourages totalling 400 persons from the ETO to Washington. This went off without a hitch, but Meeks personnel still get a nervous twitch when anyone says "Eversharp."

Farewell to 'Grandpappy'

"Grandpappy," sire of the Superfortress, is being dismantled at Albrook Field in Panama. The Big B-15, which had seven feet more wingspread than the B-29, never saw combat, but it did achieve an enviable transport record. Over an 18 months' period "Grandpappy" carried more than 100,000 pounds of freight and 5,350 passengers to various bases of the 6th Air Force in Panama and elsewhere. Perhaps the big plane's major contribution was academic, however. Its flight characteristics and records were closely studied by engineers who evolved the Superfortress.

Evacuation

The following account of one evacuation mission has been set down by an AAF evacuee, Lt. Michael Frome. This little sketch, multiplied by countless thousands, has been enacted in all the theaters of the war:

There are odors of war which etch the brain with their tragic presence, then return again in pleasanter places; sometimes they mingle with the fragrance of ham and eggs, a can of tobacco or a woman's perfume.

Okinawa was bloody in May. Mangled Jap bodies lay where they had fallen. American wounded were picked up, sulfa was sprinkled over their wounds, and they were evacuated by air. Thick plaster casts were moulded around broken bodies and they were moved thousands of miles to the east, to heal and forget rain-soaked Okinawa.

Late one night the evacuation plane dropped down on Kwajalein in the Marshalls to refuel and change crews—Kwajalein, once rich with palm trees, now flat as

In Iceland, cold living—

Warm swimming—

Fine skating!

NEW BOOKS

WAR

DOCTORS AT WAR. *Morris Fishbein.* Accomplishments of American doctors in World War II. DUTTON, N. Y., 1945.

MEN UNDER STRESS. *R. R. Grinker* and *J. P. Spiegel.* Case studies describing how the physical strain and emotional upheaval of battle have affected men. BLAKISTON, PHILADELPHIA, 1945.

HISTORICAL

RUNWAY TO THE SUN. *Robert L. Scott, Jr.* Boyhood and pre-war Army flying experiences of this fighter pilot. SCRIBNER'S, N. Y., 1945.

POSTWAR

YOUR PERSONAL PLANE. *J. P. Andrews.* Civil aviation prospects after the war. DUELL, SLOAN & PEARCE, N. Y., 1945.

TECHNICAL

DEMONSTRATIONS AND LABORATORY EXPERIENCES IN THE SCIENCE OF AERONAUTICS. *Aviation Education Research Committee.* Instructions for making simple apparatus to illustrate the principles of aeronautics. MC GRAW-HILL, N. Y., 1945.

THE LAW OF AVIATION. *R. W. Fixel.* A new edition of this treatise on aviation law. MICHIE COMPANY, CHARLOTTESVILLE, VA., 1945. 2d ed.

AIR TRAFFIC CONTROL. *G. A. Gilbert.* Present and future plans for greater safety in air traffic. ZIFF-DAVIS, CHICAGO, 1945.

CLOUDS, WEATHER AND FLIGHT. *Thomas C. Gillmer* and *H. Erich Nietsch.* Practical weather forecasting, primarily in its relationship to aviation. VAN NOSTRAND, N. Y., 1944.

DYNAMIC METEOROLOGY. *Jorgen, Holmboe,* and *others.* An introduction to the subject for those preparing for a career in meteorology. WILEY, N. Y., 1945.

U H F RADIO SIMPLIFIED. *M. S. Kiver.* U. H. F. radio presented as an outgrowth of the more familiar low-frequency equipment. VAN NOSTRAND, N. Y., 1945.

METEOROLOGY FOR PILOTS. *R. W. Mudge.* Interpretation and use of weather information for flight planning. MC GRAW-HILL, N. Y., 1945.

YEAR BOOKS AND HANDBOOKS

PLASTICS CATALOG, THE 1945 ENCYCLOPEDIA OF PLASTICS. Covers recent progress in all phases of plastic materials—fabrication and use. PLASTICS CATALOGUE CORPORATION, N. Y., 1945.

These books are available to AAF personnel through the AAF Field Technical Library Service, which provides for technical libraries at all major installations. For a complete list of books so available, see TECHNICAL PUBLICATIONS FOR ARMY AIR FORCES TECHNICAL LIBRARIES, Book List No. 2, March 1945 and supplements thereto. These lists are compiled by AAF Headquarters Library.
Personal copies of these books may be obtained from the publishers or retail bookstores.

the Pacific around it. Patients able to walk climbed down for dinner. For those in their litters, food was carried in. The Red Cross was there with books, magazines and smiles.

A fresh crew, flight nurse and medical technician boarded the plane. A walk through the cabin with its oppressive heat and stench to the flight deck almost overpowering. The crew closed the cabin door and looked out into the cool darkness, the clean night.

Then they flew again, the crew mindful of the pain and suffering behind. The technician walked among the 30 sick and wounded men. The nurse began to sort out her needles: morphine for agony, eight men to have penicillin every three hours.

Among the wounded was one boy, nearer to death than all the rest, a prisoner inside his cast which covered both limbs, much of his body and one arm. After a time the flight nurse went up forward for a cigaret. She had tried to make an intravenous but the boy's vein was so tight she could not force the needle in.

Venus rose and the sun not long after. The outline of tiny Johnston Island lay just ahead. The nurse asked the radio man to call for a medical officer to meet the plane. The plane settled easily and the patients heard the nurse and a Navy doctor.

"I don't think there's any need to take him off," the doctor said. "Hickam Field is but a few hours away. We'll refrigerate the leg. He'll have to lose it. They can give him proper attention up there."

Breakfast was like a strange ritual. The odor of the cabin permeated the coffee and scrambled eggs. Then the big plane took off for Hawaii where they have hot showers, and clean sheets.

Halfway out the nurse came forward. "My boy is better," she said to the crew. "His temperature is down."

It was noon when they landed, the finish of a journey through night, 4,000 miles from Okinawa. The crew stood by to see their charges loaded into ambulances. They watched the boy in the big cast carried off and the very odor came off the plane with him. The casts on his legs were mottled green. He was blond and his eyes were open in a blank stare. They hurried him away to save his life.

Hawaii's warmth is tempered by a lovely breeze. The smell of sea is an essence of everything clean. Yet, the odors of war are sometimes indelible upon the mind.

Norway's Airdromes

The Luftwaffe's finest airfields were in Norway and not in France or the homeland, a study of German airbases has revealed. The recent survey was led by Col. Karl B. Schilling, commander of the 9th Engineer Command, who has observed German aviation engineering technique on many captured bases on the Continent and in Scandinavian countries.

In Norway excellent facilities and dispersal areas were found, and long runways, built in 1940 and 1941, were constructed of heavy concrete. Col. C. M. Spainhour, deputy commander for operations, described them as the Nazis' "best airfields seen in Europe, far surpassing those built by the Germans in France and in their own country."

Features of some Scandinavian fields were runways made of wood, airfields with barracks and housing facilities electrically heated, and camouflage methods that made plane-crowded hardstands appear empty to aerial observers.

Wooden runways were found at an airdrome in a section of Norway where labor and timber were plentiful. Made of planking and fastened to stringers by wooden dowels, the runways were reported as extremely serviceable but inclined to be slippery in wet weather .The abundance of water power in Norway makes electricity plentiful and inexpensive, and consequently it was widely used for heating purposes in the otherwise fuel-scarce country.

Camouflage methods used by the Germans were so successful that many fields,

"I don't care if you are worth 36 points to me, you're still gonna' learn to fly!"

presumably used for operations against England and arctic supply routes to Russia, were virtually untouched.

Jack-of-All-Grades

The AAF Hospital Liaison Officer is a man of many parts. He is a pleasant combination of chaplain, commanding officer and first sergeant. He can be as gabby as a Hot Charlie, as self-confident as a guardhouse lawyer, and as shrewd as a squadron conniver. His is a new kind of job; he is on his own and he will get into trouble quicker for doing nothing, than for assuming authority.

The AAF has assigned hospital liaison officers to all general hospitals. About 250 officers and men are now in the HLO program and more are being assigned. It is a voluntary service and a man must like the job before he is finally assigned. At large general hospitals the AAF assigns one HLO, two enlisted men and a secretary. To small station hospitals an enlisted man is assigned to live within the hospital. The jobs they do are as varied as human nature.

The primary duty is to give individual attention to members of the AAF. The HLO officer or enlisted man does not go into medical matters, but after an air force man has received definitive treatment the HLO can designate which convalescent hospital the man should be sent to.

The HLO is the walking delegate for any AAF patient who needs help with his personal affairs. If a soldier thinks he is entitled to an additional battle star, it is the duty of the HLO to get it for him, or determine from proper authority that it is not due. The HLO is there to straighten out all matters of back pay. He arranges air transportation, leaves, furloughs, even dabbles in family troubles at times. Nothing daunts the HLO. Whatever his rank, a patient can take his problem to the HLO.

Consider the case of the master sergeant at Brooks General Hospital in Houston, Texas. The sergeant was being discharged on points, and his wife was having a baby. It looked like it was going to be a tie, or worse, the baby might come the day after the sergeant was released. In that case the medical care for the wife and child would have to be paid by the family. The AAF hospital liaison officer took up the case for the soldier. For a time it looked as if nothing could be done to hold up the man's release. The HLO took it to the commanding officer who kept the sergeant in the Army an extra day. The baby was born, and the father was discharged the following day.

At Bushnell General Hospital in Brigham City, Utah, the record of T/Sgt. Joseph Ford is an enviable one. Serving on the HLO staff of Capt. Robert E. Wallen, the sergeant revealed the joys of air travel to AAF men and other forces alike. In a six months' period Ford arranged free air transportation for 1,600 men through the ATC at Hill Field, Ogden, Utah. He obtained 1,300 sick leaves, 100 emergency furloughs and 25 trips to Hawaii.

"We arranged air travel for ground force men just the same as AAF men," Ford said. "It made a mighty fine impression on them, too. Most of them would say, 'Boy! That's the air force for you!'"

Postwar ATC

Lt. Gen. Harold L. George, commanding general of the Air Transport Command, has revealed that under present planning, a nucleus of the ATC is expected to remain as a permanent part of the Army Air Forces but that within a year the Command may be cut down to 500 planes or less, provided commercial airlines expand as rapidly as anticipated. The ATC's 3,400 planes now fly world-wide routes which total more than 166,000 miles.

General George predicts that in the future, commercial airlines will operate 4,500 planes in the United States alone, as compared with an estimated 600 aircraft now flown on domestic and foreign routes. The expansion may require four or five years, but if it is reasonably rapid the ATC may cut down eventually to 250 planes.

The general said he regarded commercial airlines as a permanent "backstop" for the military air transport organization and added that it is vital for the welfare of the country that strong commercial airline systems be established, both for domestic and foreign use. He considers the commercial companies as trail-blazers for the military organizations, both in the manufacture of new types of planes and in developing flying techniques.

The postwar Air Transport Command can be primarily useful in three ways, according to General George: (1) to advance special research which will be useful to military air transport; (2) to encourage the commercial companies to incorporate any features of potential military usefulness into the designs of their craft, where it can be done without hampering commercial operations; and (3) to provide special air service for the occupied countries and for out-of-the-way bases in instances where it would be uneconomical for the commercial lines to meet the needs.

General George pointed out in this connection that there are remote military bases in both the Atlantic and Pacific which probably will be maintained, and that it is not likely that there would be any demand for commercial planes to operate into these bases, thus leaving such transportation as a future job for military craft. All these future decisions, the general pointed out, were speculative and dependent upon action ordered by the War Department, with the approval of Congress.

TAD Decentralized

The Training Aids Division, of the Office of the Assistant Chief of Air Staff, Training, was decentralized on September 1, with its functions divided primarily between the Training Division of AC/AS, 3, and the Air Technical Service Command under supervision of AC/AS, 4.

An AAF letter and two AAF regulations signify the change and also clarify further responsibilities of AC/AS, 3 and 4 with regard to training aids and the supply and maintenance of training aids. These are AAF Letter 20-18, "Discontinuance of the 4th AAF Base Unit (Training Aids)," 18 August 1945; AAF Regulation No. 50-19 (Revised), "Training—Training Aids," 1 September 1945, and AAF Regulation No. 65-106, "Supply and Maintenance—Training Aids," 23 August 1945.

Because of the reorganization, correspondence on training aids should be forwarded in accordance with regulations as follows: on training films, in accordance with regulations; requisitions for film strips and target films to ATSC Training Film Unit, One Park Avenue, New York 16, New York; requisitions for supply of all other training aids (not on allowance tables) and requests for establishment of all training aids projects to Commanding General, Air Technical Service Command, Dayton, Ohio. ☆

40-206950B	42-167071I	42-412035F
41-11871G	42-187852G	42-420932F
41-13855F	42-191732F	42-443617B
41-28066B	42-291829A	42-464907C
42-4230H	42-293117F	42-779096C
42-1037178D	42-342286E	42-780065B
42-137584D	42-38754B	42-795823A

Return to field indicated by letter after number as keyed below

A—Ferrying Division—ATC, Fort Dix Army Air Base, N. J.
B—AAF Proving Ground Command, Eglin Field, Fla.
C—Lockbourne Army Air Base, Columbus 17, Ohio
D—Coffeyville Army Air Field, Coffeyville, Kansas
E—8th AAF Base Unit, Winston-Salem, N. C.
F—Ferrying Division—ATC, Rosecrans Field, St. Joseph, Mo.
G—Headquarters, Luke Field, Phoenix, Ariz.
H—Moody Field, Ga.
I—Big Spring Army Air Field, Big Spring, Texas

HOW SHARP ARE YOU?

QUESTIONS

1. Where is a ladder?
2. What number appears on the airplane?
3. There is a metal container on the crew chief's stand. True or false.
4. What airplane is shown?
5. Not counting the compressor, how many metal containers are in the picture?
6. One of the engines is minus a propellor. True or false.
7. How many men are standing on the crew chief's stand?
8. How many men in the picture?
9. One man is wearing a helmet. True or false.
10. The bomb bay doors are closed. True or false.

ANSWERS ON PAGE 57

Big moment at Ie Shima. Wheels down, the first of two Jap bombers carrying surrender delegation prepares for landing on island strip.

Hundreds of officers and GIs from the garrison at Ie Shima airstrip are on hand as the first white-painted Betty taxies to a stop.

Americans waste little time in transferring Japs to ATC airliner.

Glum after the icy reception at Ie Shima, Japs make ready to board the

Unsmiling Japs, bedecked with samurai swords, carry own baggage.

Japanese surrender delegation proposes to say it with flowers. Several crew members bring bouquets to Ie Shima as token of "peace and friendship." Americans curtly refused them.

nerican airplane that will fly them to Manila on final lap to surrender conference.

Ie Transfer

PHOTOS BY SGT. NORMAN L. PRATT, 4TH AIRCRAFT MAINTENANCE UNIT (F1)

The crowd around the airstrip at Ie Shima stood quietly in the noonday sun observing the unfolding of history with the impassive curiosity of village idlers watching the unloading of a circus at the railway depot. When the two white-painted Betty bombers with their green crosses rolled to a stop, officers and GIs sought to capture the moment with scores of cameras.

There were no smiles, salutes or handshakes. In the cold formality of the reception bouquets of flowers carried by one of the surrender party became incongruous baggage.

Maj. Gen. Charles A. Willoughby and his aides lost little time in hustling the Japs aboard an ATC C-54 with plush seats in which they rode the final lap to Manila. At the Philippine capital, the Japanese representatives received curt instructions on how their beaten nation must carry out the unconditional surrender. In a matter of hours, they were back at Ie Shima and aboard their Bettys for the return to Tokyo. At Ie there was a final touch to their ignominious journey. One of the Jap bombers piled into a ditch on take-off. But no one was injured, and the orders they carried back with them were the basis of Japan's formal acknowledgment of defeat aboard the battleship Missouri on September 2. ☆

AAF QUIZ

Here is something new in AIR FORCE brain twisters. Beginning this month, every question in the AIR FORCE Quiz will be based on information contained in the preceding 12 issues. If you have been reading AIR FORCE carefully, this should be easy. See Page 61 for answers.

1. The XCG-10A and XCG-16 gliders are characterized by
- A. *Built in radar equipment*
- B. *Retractable landing gear*
- C. *Boom tail design*
- D. *Biplane construction of wings*

2. An anchored R-4 helicopter being used to study the effects of ice on rotor blades is located at
- A. *Eglin Field, Fla.*
- B. *Ladd Field, Alaska*
- C. *Mt. Washington, N. H.*
- D. *White Face Mountain, Vt.*

3. Sharp spikes inserted in the nose of demolition bombs were used to great advantage by the AAF in Burma to destroy
- A. *Railway tracks* B. *Oil tanks*
- C. *Wooden shipping*
- D. *Targets located on steep hillsides*

4. The XR-8 helicopter features
- A. *Three engines*
- B. *Jet propulsion*
- C. *Dual intermeshing rotors*
- D. *Pressurized cabin*

5. High speed, jet propelled aircraft necessitated a new rate-of-climb indicator with a dial range of
- A. *0 to 15,000 feet per minute*
- B. *0 to 20,000 feet*
- C. *0 to 6,000 feet*
- D. *0 to 10,000 feet*

6. Johnston Island, ATC stop between Hawaii and Kwajalein, is approximately
- A. *10 miles long and 1 mile wide*
- B. *1 mile long and ¼ mile wide*
- C. *84 miles long and 22 miles wide*
- D. *Crescent shaped; 3 miles long and a mile at the widest point*

7. AN/APS-13 indicates a
- A. *Plane used by both Army and Navy*
- B. *Rating of an air navigation specialist*
- C. *Warning set*
- D. *Section of Hq of an air force*

8. The Aeronautical Division of the Office of the Chief Signal Officer, forerunner of organizations that grew into the present AAF, was established in
- A. *1901* B. *1907* C. *1914* D. *1916*

9. A dynamometer is a
- A. *Power unit in a jet engine*
- B. *Dial for measuring explosives*
- C. *Instrument for measuring power*
- D. *A portable dynamo*

10. In overseas movement of B-29s, Mather Field was most important as a
- A. *Port of Aerial Embarkation*
- B. *Engine repair depot*
- C. *Practice bombing range*
- D. *B-29 flight engineer school*

11. The AAF has used pentothal sodium as
- A. *Cylinder cleaner*
- B. *Binder for airstrip surface*
- C. *Dope for life rafts*
- D. *Sedative for personnel*

12. "Gaspareolor" is a new
- A. *Color code for poison gas.*
- B. *Process for color-printing photographs*
- C. *Close coordination attack marker*
- D. *Overtones on a radio intercom*

13. "Trimetrigon" is
- A. *Three-winged aircraft*
- B. *Term used in aerial photography*
- C. *Land-sea-air attack*
- D. *Trigonometry applied to measure gas consumption*

14. A man may wear a battle star for "Sicily" if he served in air operations in Sicily and adjacent waters in the period
- A. *January 1—March 15, 1943*
- B. *May 14—August 17, 1943*
- C. *August 20—November 1, 1943*
- D. *Anytime in 1943*

15. Service in the WAAC is counted for longevity pay of a Wac
- A. *True* B. *False*

16. The "L" P-38 has a maximum ferrying range in miles of about
- A. *3,000* B. *4,000*
- C. *2,800* D. *1,900*

17. The P-61 can carry a bomb load equal to that of a B-25
- A. *True* B. *False*

18. The aircraft repair "Floaters" in the Pacific were
- A. *Helicopters*
- B. *Maintenance submarines*
- C. *Specially equipped barges*
- D. *Converted Liberty ships*

19. PB-4Y2 is a Navy adaptation of
- A. *B-24 with single rudder*
- B. *B-24 with two engines*
- C. *B-24 with a gull wing*
- D. *B-24 for amphibious landing*

20. Identify this airplane.

THIS WAS IT

(Continued from Page 6)

men and girls were counted, kept shouting. "There's always room for one more!" And in the camps and hospitals of the AAF the world over, wounded men cheered, embraced their nurses and wept for joy.

But despite the hilarity, many a soldier paused in contemplation, sobered by the memory of the many thousands of Americans who fell along the long road to total victory.

"The first thing I thought of was my two brothers," said one member of a fighter group still in Europe. "One of them was wounded on Okinawa. The other is a Marine. Now both of them will be coming home—safe."

Chaplains led prayers of thanksgiving. In Chungking, Chaplain John S. Kelley prayed for the deceased members of the 14th Air Force, and expressed the hope "that they will not have died in vain." Maj. Gen. Charles B. Stone III, commanding general of the 14th Air Force, called the men to attention while an officer struggled with a wheezy old pump organ to render the "Star Spangled Banner."

Once the first blush of the great news had worn off, AAF men everywhere began to talk about point totals, going home and eventual discharge. "Sure, we're happy about this news from the Pacific," said a sergeant of the 9th Aviation Engineers, "but we're more interested now in finishing up this job so we can start packing for the last time. It ought to speed up our return to the States." His unit was still building airfields in France.

By a strange quirk, peace, when it finally arrived, came gently to the battle-scarred islands of the Pacific where the war had raged fiercest. On Guam, for example, August 15 brought no snowstorms of ticker-tape, no wild firing of ack-ack guns, no torchlight parades and drums. The whole island just seemed to breathe an audible sigh of relief at the long awaited news.

Most of the AAF men on Pacific islands had been out there since the beginning. Many wore the European Theater ribbon as well. All of them had been surrounded by war so long that the sudden ending left them a little dazed and uncomprehending as to what peace really meant.

"It will seem incredible to have the B-29s idle on the field," muttered a medic on Guam. "So many nights we have waited for their return, watching them drop flares for emergency landings, or to show that there were wounded aboard. There hasn't been much use in dreaming before now, but at last we can think of what the most beautiful girl in the world—American—looks like in a bathing suit."

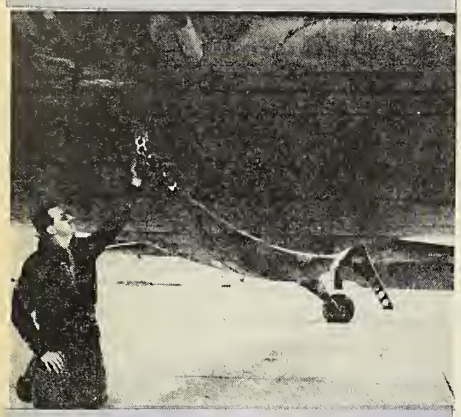
It was apparent to all that for many the trip home would be made via Tokyo. Emotions on this subject were mixed; many men wanted to get a good look at the empire they had been working to destroy. But for the most part everyone wanted to get home, and fast.

Getting home really was the guts of the thing for the men of the AAF wherever they were. ☆

Pick-up by Helicopter—Page 51

technique

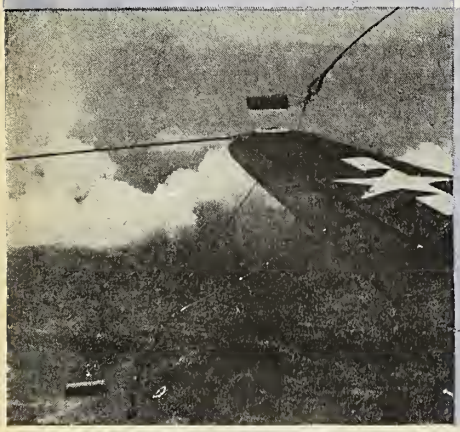
Development, Maintenance and Supply of Aircraft and Equipment



A glider tow mechanism and a line is fixed under plane to be towed.

On the other plane, a hook and line arrangement is pinned to wingtip.

As damaged plane loses altitude, the sleeve-stabilized towline is dropped.



Second plane passes under craft with wingtip hook catching line.

Hook disengages itself on contact and cables lock to complete towline.

Plane Pick-up in Mid-air

As a development of glider tow methds, an aerial pick-up system recently enabled a damaged plane to be saved from a crash landing and towed back to its base for repairs. A pick-up hook was mounted on the left wingtip of the towplane in full view of the pilot, and when he saw a member of his formation in trouble he maneuvered his plane so that the hook made contact with the 250-foot weighted nylon rope which the disabled plane's crewmen had tossed overboard. The wingtip hook was held in place by a soft aluminum pin which broke off under the air load when contact was made and swung out behind a conventional glider tow release mechanism to which it was attached by a short length of nylon rope. The pilot of the towplane could release the injured craft at any time after the pick-up, just as he would cut loose a glider.

No radio communication between planes was needed, and all the pilot of the assisted plane was required to do to effect a successful pick-up was to maintain a straight and level course. If the speed of the planes was correct—no more than five mph difference between them—the elasticity of the nylon would absorb the shock and the entire operation would be almost unnoticeable. After contact, the towplane maintained a straightforward direction relative to the towed aircraft, and while there was a tendency for the tractor plane to become nose-heavy, trim could easily remedy this.

The system was first tried in April of this year at the Clinton County Army Airfield, Wilmington, Ohio, where the aerial pick-up was attempted with two C-47s, one of which played "wounded" by cutting out an engine. A standard glider tow release was located below the fuselage near the center of the wing, and the nylon rope was stowed inside a dural sleeve that acted as a stabilizer during trailing. The other C-47, which had the pick-up hook on its wingtip, maneuvered into position, made contact with the dangling rope and continued on its flight towing its sister ship behind it.

Since that initial try, many pick-ups have been successfully completed, including one in which a C-47 had both engines shut off and props feathered. The originators of the method, engineers of the ATSC Aircraft Laboratory, Glider Branch, believed that the system is applicable to all bombardment aircraft, including B-29s.

Glider Deceleration

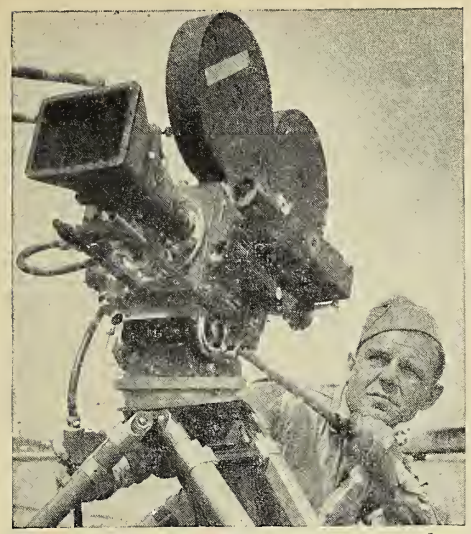
In their study of various devices to bring gliders to a stop after landing, glider experts are conducting experiments with rockets and parachutes.

The most spectacular system is the rocket arrangement, in which two solid propellent rockets are slung on strut attachments under the wings, one on each side. Each rocket is capable of producing approximately 1,200 pounds of reverse thrust power and is fired by the pilot at the instant the glider touches the ground, bringing the craft to a stop in one-half the normal landing run. The rockets employed are of the smokeless type and the whole installation weighs less than 100 pounds.

The use of a parachute as a brake is quite common, having been previously applied to power-driven planes. For gliders, however, a 24-foot or 28-foot chute is attached to the glider's empennage, and just before the ship lands it is opened to produce a powerful drag force. Perfect timing is necessary to get the best results.

Wright Field "Newsreel"

An important part of the work performed by the Motion Picture Branch of ATSC's Technical Data Laboratory at Wright Field is the production of a semi-monthly Engineering Staff Report—a "newsreel" of late engineering developments which furnishes the generals and the laboratory chiefs with visual demonstrations of experiments and tests conducted in the field's many installations. Behind the closed doors of laboratories or up in the sky, a special staff of cameramen under the supervision of Lt. Col. R. J. Cunningham train their lenses on top priority projects—and on the "secret" or "confidential" celluloid footage that rolls through their cameras is the irrefutable picture story of the AAF's progress toward the improvement, perfection and utilization of air power.



Using a 35-mm motion picture camera during a test flight at Wright Field, photographer makes a film record of technical data.

Making the films isn't easy, nor is it always safe. Ninety percent of the photography is done under field conditions, much of it in aircraft during flight. Cameramen ride in the nose of attack planes 20 feet off the ground at 300 mph, or in the freezing air of a bomber's belly seven miles above the earth. "You never know what's going to happen during a test," explains one of the specialists. "It's like trying to get a wild lion to pose for you."

When they were filming trial launchings of the JB-2 bombs, for example, one of the robombs caught fire and failed to leave the ramp. Cameramen ducked for cover behind a concrete embankment, leaving their equipment. One of them, however, had the presence of mind to leave his camera running, and when the bomb exploded, blowing the equipment off its tripod, 400 feet of precious film were salvaged from the magazine, revealing to engineers exactly what had occurred.

All types of motion picture cameras are used, ranging from studio-type 35-mm Mitchells to tiny 16-mm GSAPs that grind away at speeds up to thousands of frames per second. Pictures are made in full color or in black and white, and sound men follow the cameras to catch the facts for the ear as well as for the eye. Large developing tanks and related equipment process 12 miles of film every 24 hours.

Heavy Freight by Air

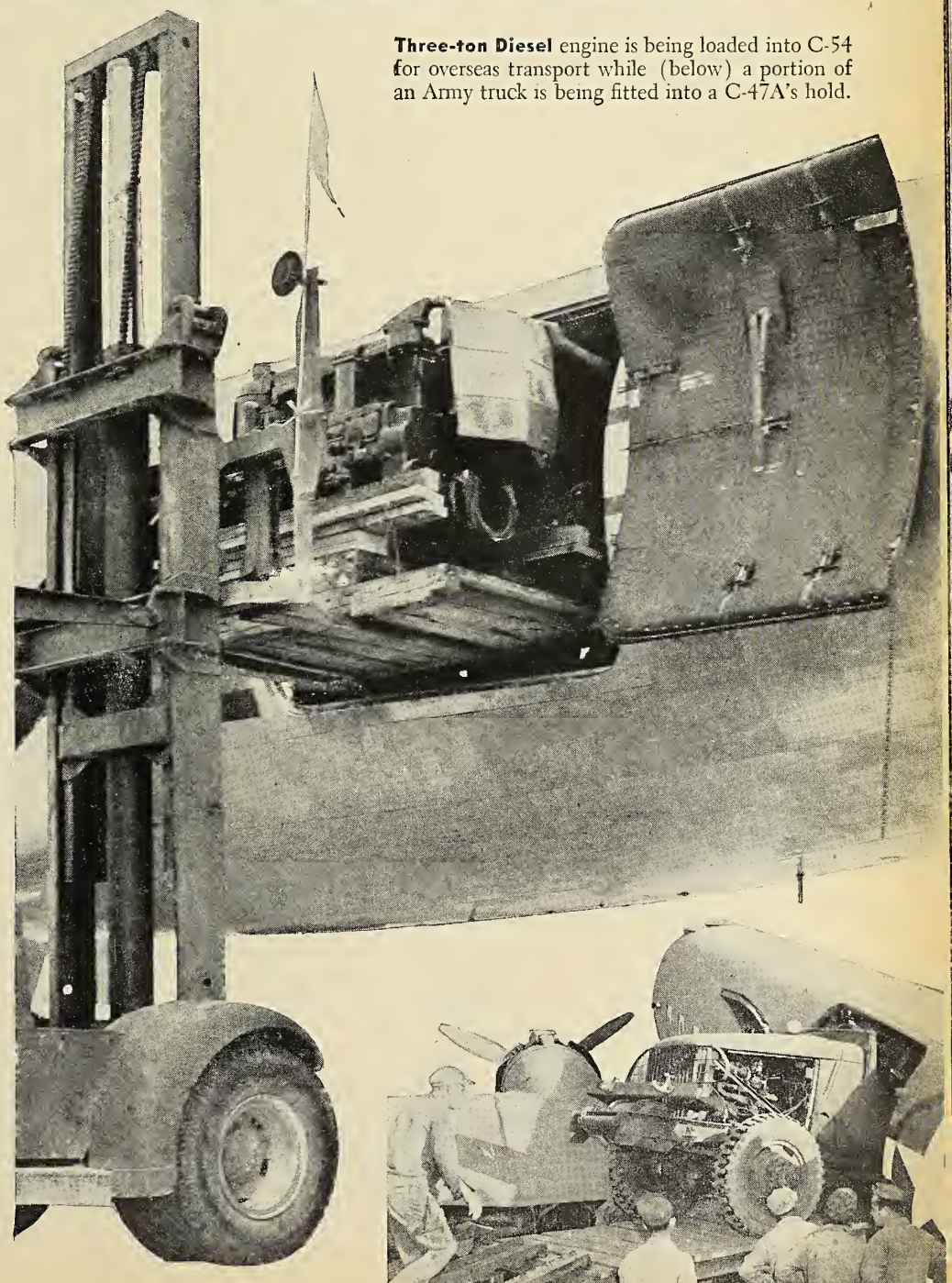
Two outstanding indications of the feasibility of transporting heavy machinery and equipment by air have recently been revealed at widely divergent parts of the globe. At Assam, Burma, a fleet of C-54s arrived with a cargo of 15 three-ton Diesel engines which had come by air from ATC's Miami, Fla., Air Field by way of Chabua, India, while at an Air Service Command base in Italy, vitally needed 2½ ton trucks were loaded into C-47As and flown across the Adriatic to Yugoslavia.

The Diesel engines were destined for Caterpillar tractors being used by Army Engineers in their construction of the Ledo Road, and by a special repacking process before air shipment, more than 1,000 pounds of weight in crating was eliminated from each individual engine. They were then built onto wooden skids to prevent slippage while in transit and loaded aboard the giant C-54s for their overseas journey.

In the Italian instance, the OSS in Yugoslavia had sent an urgent appeal stating a desperate need for heavy capacity transportation. After consultation with the Automotive Maintenance Section and the Ordnance Maintenance Company of the AAFSC/MTO, it was decided to cut each vehicle up into three or four major sections which could be loaded into a cargo type plane and which could be reassembled at the unloading point with a minimum of tools, material and time.

After securing the maximum information available concerning weights and cubage from the operations officer at a local airfield, the work of dismembering the first GMC vehicle began. All parts such as fenders, running boards, cargo bed, etc. were loaded on a truck and driven to the airfield, while

Three-ton Diesel engine is being loaded into C-54 for overseas transport while (below) a portion of an Army truck is being fitted into a C-47A's hold.



tech topics . . . about aircraft and equipment

One B-26 has been equipped with a new type of landing gear. It has two retractable main wheels mounted in tandem on the fuselage and two smaller wheels on free-swiveling mounts near the wing tips, like the floats on a flying boat, to keep balance. The gear is being tested for possible use on an unconventional aircraft design.

Something new in helicopters is the tiny G&A single-place XR-9, which the AAF now is testing for possible use as a liaison aircraft. Called the "rotorcycle," it weighs about 1,600 pounds, has a three-bladed main rotor and a small tail rotor.

Recent tests by the Aero-Medical Laboratory at Wright Field indicate that the "g" tolerance of man is not adversely affected by Benzedrine in reasonable dosage either during the time that the drug is actively producing its effect or in the period after the Benzedrine wears off. . . . A warning light, activated by gravity forces and to be located on the instrument panel, is being developed to afford the fighter pilot a positive and reliable warning when "g" forces approach the stress limits of his aircraft.

Piloting gliders behind tow-planes during blind-flying conditions is being made easier by the use of a simple position indicator on the intrument panel which tells a pilot his glider's position relative to the tow-plane at all times, even when the plane on the other end of the tow-line can't be seen. A sensitive arm-like device which lays across the tow line picks up every turn and twist of the rope and actuates the indicator in front of the pilot, recording all changes in position. . . . Use of a high-speed type flap actuating mechanism on the CG-10 glider permits raising and lowering the flaps in less time than ever before. Tests employing larger diameter tubing to carry a more powerful hydraulic charge run the flaps up or down in nine seconds whereas it used to take about 15. . . . Improved rubber shock mounts for the small engines on powered gliders have eliminated most of the excessive vibration previously experienced.

Numerous tests to determine parachute seat cushion comfort indicate that a simple, uncompartmented air-filled bladder is most efficient in preventing soreness for the buttocks. Under development is a bladder covered with a canvas duck material. A bulb-valve system permits regulating amount of air in the cushion, hence providing "personalized" comfort to the individual's liking.

Tests recently completed using a fluorescent sea-marker chemical as an anti-sunburn lotion indicated that protection

offered is negligible. Acro-Medical experts recommend that it not be used despite previous experience.

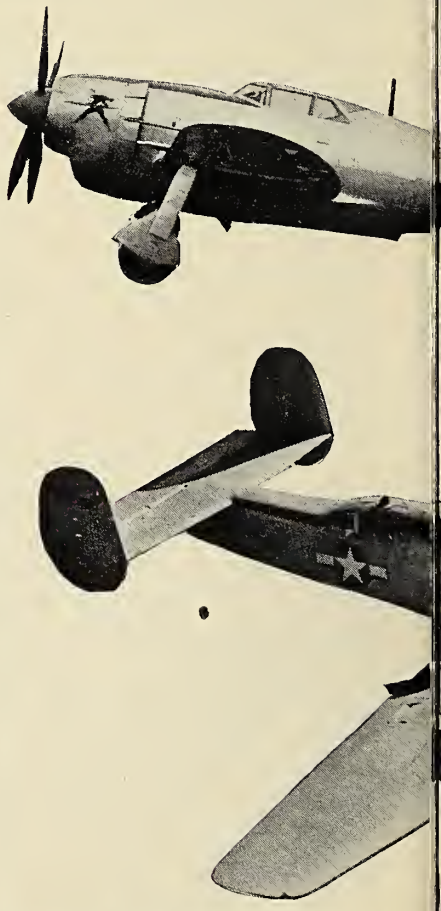
Under development is a light and compact pressure demand oxygen regulator for use with bailout oxygen equipment. Essentially it is a miniature demand oxygen system that automatically forces oxygen into a flyer's lungs during bailouts from high altitudes. . . . A coiled aluminum-tubing oxygen container also is being developed experimentally as part of the bailout oxygen assembly. The new container, made of one-half inch aluminum tubing coiled into an eight-inch diameter "pancake," can be located inside a conventional parachute pack, eliminating the need for special bailout bottle pockets in a flying suit. . . . A small Oxygen Servicing Trailer (Type E-2) has been standardized for use in the field to recharge oxygen systems of heavy and very heavy bombardment type aircraft. Constructed of tubular steel, the trailer can be towed by a jeep, tug or truck over all types of terrain. . . . Because leather and cloth in the H-1 goggle are subject to mildew and deterioration in the tropics, a carrying package made of vinyl chloride, evacuated of air and heat sealed, is being included in the B-4 emergency kit and the C-1 vest. This affords ample protection against mildewing and tolerates exposures to high altitude pressures without bursting.

A new cockpit panel lighting system has instruments mounted in tiers with each tier lighted by a small light extending the length of the panel. This affords illumination of the instruments without reflections on instrument dial faces and without causing stray light in the upper areas of the cockpit. . . . Cylindrical filters to provide fluorescent or colored light can be fitted over the light and rotated to control brightness.

the two chassis components were towed, with a supply of gasoline, oil and hand tools being included. On arrival at the field, a loading ramp and platform were set up alongside a C-47A. The forward component of the truck was driven into the plane under its own power, and the platform was then moved to another plane and the rear section was loaded, with loose parts being fitted into unoccupied space in the two cargo carriers. A third plane was used to transport loading platform and ramp, hand tools, fuel, oil and personnel.

Experimental Warplanes

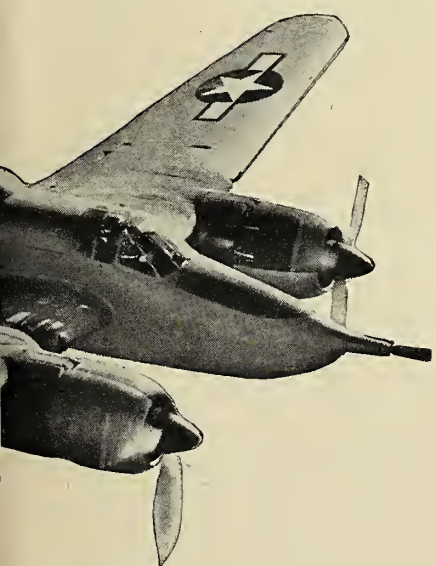
With the war at an end, the same proverbial pat on the upper fuselage accorded to the combat planes of the AAF may well be given to those experimental models which served as prototypes or forerunners of operational aircraft. Three of these, the XA-38, the XP-47J and the XP-58, can resume their inactive status with pride in their accomplishments and the feeling of a job well done.



P-47J (top) was used to determine speed and flight characteristics of new Thunderbolts. XA-38, an experimental attack bomber (center) featured 75 mm cannon in nose, while larger Lightning (right) designated XP-58, offered data for heavier, two-man fighters.

The XA-38 was a new departure in attack planes, having been built around a 75 mm cannon. Designed by Beech, the craft carried a pilot and a gunner and mounted six .50 caliber machine guns in addition to the big gun. Power for the plane came from two radial, air-cooled R-3350 engines, each capable of producing more than 2,000 hp, and although the plane was never out of the laboratory stage, it proved extremely speedy for its 29,000 pounds. Having no bomb bay, all bombs were carried in externally-hung wing racks.

The XP-47J was the guinea pig plane that led to the production of the P-47M and the long-range P-47N — both of which distinguished themselves in Pacific combat — and has proved its value many times over in furnishing information on power plant, airframe and turbo-supercharger modifications. In outward appearance the plane looked little different from an ordinary P-47D. Internally, however, it incorporated many engineering innovations that were calculated to make it the fastest plane ever built in this country, except for the P-80. Weight was cut 1,000 pounds with the adoption of a new wing construction which eliminated some ribs and structural members, while still retaining strength and rigidity. The engine cowling diameter was reduced to cut down on drag, and a fan was installed in front of the 2,800 hp engine to suck air in over the cylinders and to cool the engine for maximum altitude and maximum climb performance.



The XP-58, conceived as the logical development of the Lightning and intended as the forerunner of faster, heavier, two-man fighter planes, was a twin-boom model half again as large as the P-38, which could throw its 34,000 pounds around the sky at better than 400 mph. A remote sighting arrangement operated the upper and lower turrets in the manner of the A-26, while a 75 mm cannon was originally planned for the nose.

Pick-up by Helicopter

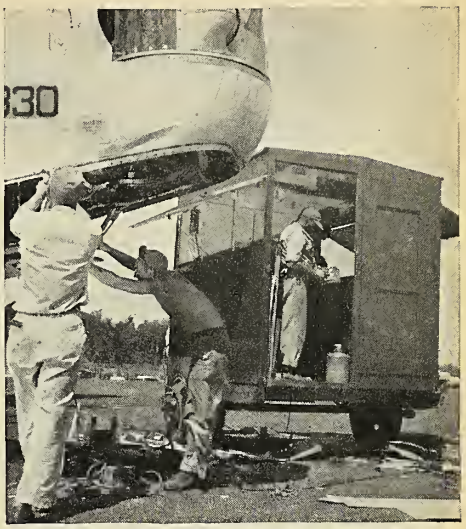
Using a new personnel pick-up device, helicopters engaged in rescue work can now lower a boatswain's chair to a stranded airman and hoist him safely into the cabin. A small, hydraulically driven winch, a line boom with pulleys, 150 feet of steel cable, and the seat are all necessary extra equipment.

The pick-up mechanism, installed on a rigid boom, is assembled forward of the main rotor support arm and is operated by push-button controls on the stick. With the helicopter hovering at a convenient height, the pilot pushes the "Down" button and the winch lowers the boatswain's chair. The man on the ground then climbs in, fastens a belt and signals to be hauled aloft, whereupon the "Up" button is pressed and he is reeled in at the rate of 1½ to 2 feet per second until he is in a position to climb aboard. (See Technique cover.)

The rescue gear weighs about 75 pounds and can lift 500 pounds.

Trailerized Flight Line

A completely mobile, compact and efficient repair unit for the maintenance of heavy bombers was in operation at a 7th Air Force B-24 base in the western Pacific. Built by ground crewmen, the flight line on wheels was composed of at least 10 trailers, housing engineering, armament, ordnance, communications, sheet metal, instrument repair, propeller and electric shops. Tires and wheels of Japanese trucks left behind by the enemy comprised the chassis, while the bodies were made of plywood.



Each phase of maintenance is carried out by separate trailer in this mobile flight line. Above, 7th AF sheet metal men are at work.

Almost all technical equipment needed for the maintenance of Liberators, except engines and wheel assemblies, could be packed in the trailers and made ready to move within 24 hours after an alert. And when B-24s arrived at an advance base which was lacking in facilities for maintenance, the trailers could be pulled into a space near the planes and the wires connected to the portable generators.

B-29 Comfort and Safety

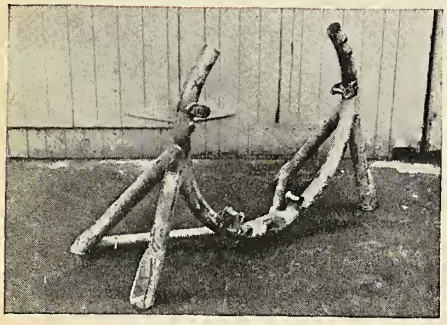
Superfortress modifications recommended by the ATSC Aero-Medical Laboratory to increase the comfort and safety of crewmen—including a means of minimizing decompression dangers, a more suitable seating arrangement for side gunners and revised construction of the tail gunner's compartment —have recently been incorporated in B-29 production programs.

Early models did not have doors in the communication tunnel above the bomb bay, and during unintentional decompression periods, air approaching the velocity of a 140-mph gale blew through the passageway, endangering personnel. To prevent crew members from being sucked against the tunnel wall, a door has been added at each end of the tunnel to seal it off under all conditions of decompression. Both doors are closed at all times during flight except when entrance into the tunnel is desired.

To make things easier for the blister gunner, his compartment has been widened about eight inches and an extra seat has been provided which swings out when he desires to use it. Although he still uses the upright chair-type seat during take-offs and landings, he can

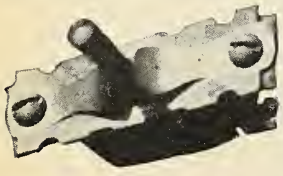
maintenance tips . . .

from the crew chief's stand

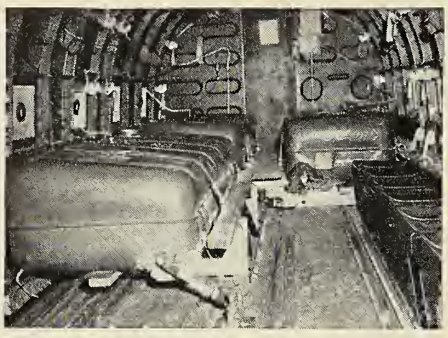


When an aircraft engine has to be shipped by air, a special mount may be made out of steel tubing which can be fitted to the floor of the cargo plane to retain the engine securely during transport. After bending the ring to shape, drill holes for the engine bolts and weld on legs and braces. Idea was submitted by men of 2nd Base Air Depot, Blackpool, England, who had mass-produced the mounts for redeployment.

Reports from the Philippines indicate that the two-position toggle switch for turning on starter motors in A-20H-10 and A-20H-15 planes were sticking in the "on" positions and were failing to return to the "neutral" position, thus resulting in the burning and loss of starter motors. Suggestion from Sgt. Clarence J. Wytas, electrical specialist with a bomb group of the 5th Air Force, would remedy malfunctioning by a simple modification to the switch. Fasten two small pieces of spring steel to the upper and lower portions of the switch face-plate so that the free ends rest against either side of the switch lever to exert equal spring tension. Any movement from "neutral," therefore, increases spring tension in that direction, and upon release, the lever is forced back to the "neutral" position. Photo shows toggle switch as modified.

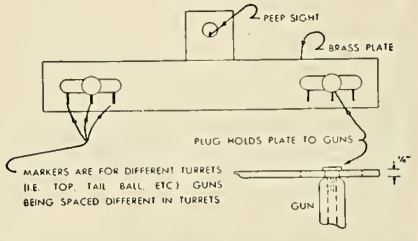


The papier mache "bolero" tanks used in C-47 cabins for long overwater journeys may be replaced by the Skymaster's metal wing tanks which in turn are being abandoned in favor of self-sealing tanks. According to M/Sgt. Merrill A. Shaw, a squadron line chief in the 434th Troop Carrier Group, the metal wing tanks can be installed by using the same wooden cradle, valves and tubing employed in the bolero tank installation, and have many advantages over the latter. There is a saving of approximately 50 percent in cabin space, 200 additional gallons of gas can be carried in the three metal tanks, light baggage and equipment can be stored on top of them, and it is estimated that eight to ten passengers and their baggage can be carried on a 2,000 mile flight, as against the three passengers that could be accommodated under the former system.



"While serving with the 5th Air Force in the Southwest Pacific," reports S/Sgt. Dillard E. Payne, "I found that the A-2 and A-3 rubber life rafts are often damaged by insects. By spraying the rafts with DDT insect spray from the vapor bomb, I was able to insect-proof the rafts effectively. No damage resulted from such treatment, and a single spraying was effective for several weeks."

To boresight and harmonize turret guns on combat aircraft, make a template out of ¼" brass plate, slotted at each end with markings to indicate the spread required by each set of guns. At the center of the template, fasten an upright in which is drilled a hole large enough to permit unobstructed sighting. To use, place the template on the gun barrels so that its scaled surface faces the turret After the desired spread is obtained, sight



the guns by aligning a distant object with the turret sight through the opening in the center upright of the template. S/Sgt. Joseph Felzer, a 50-mission veteran of a B-24 crew in Italy, who originated the system, says that as long as you are certain that all guns are at a 90-degree angle, every Liberator turret except the ball turret can be harmonized in 45 minutes.

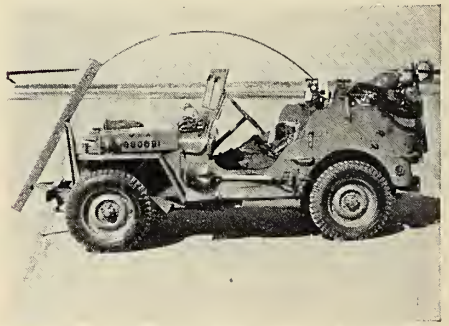
shift to the auxiliary seat or use a specially padded knee rest to continue his scanning of the skies during flight. A second safety belt permits him to change his position at will, affording comfort on long hops.

So that an injured tail gunner may be extricated from his compartment during flight, four wing-nuts make it possible to remove a U-shaped doorplate through which a man can crawl, while the removal of hinge pins will take the door off completely. A release handle lowers the seat so that the gunner falls backward and off the stool in a sitting position, after which the seat can be shoved out of the way and the man pulled from the cramped compartment.

Fire Fighting Aids

Several modifications to existing equipment have been developed at Eglin Field, Fla., and at Fort Worth Army Air Field, Texas, to prevent fire hazards and to serve as emergency fire fighting apparatus.

At Eglin Field, the danger of fire in



Jeep is equipped with radio, fire-fighting and fence-cutting apparatus, is directed to fire by plane, uses direct, overland route.

oil servicing trucks caused by dripping oil in the hose compartment has been effectively forestalled by a non-drip servicing nozzle, recently tested and approved. The heavy duty nozzle will deliver 10 gallons of oil or 30 gallons of gasoline at an average temperature of 70 degrees F. It is easily cleaned and has a removable spout which can be replaced in the event of damage. Also, the handle has been changed to a more desirable design.

At Fort Worth, the speedy, dependable jeep has been converted into a most useful piece of airplane crash fire fighting equipment. It carries a supply of fire extinguishers and forcible entry rescue tools to rescue flying personnel, while a two-way radio permits contact with the control tower and the search airplane, which directs the jeep to the scene of the crash by the most suitable route. On receipt of information over

the crash alarm circuit, the jeep proceeds directly overland to the crash-fire, disregarding terrain obstacles that would bar heavier trucks and passing through fences by means of a special type fence cutter mounted on the front. The vehicle is painted "fire department" red, permitting easy identification by the guiding plane.

B-29 Training in Liberators

When the Superfortress was still a "whisper ship," a program was started at Sheppard Field, Texas, to train B-29 flight engineers. Since one of the big planes itself was not available, due to the urgent need elsewhere, it was initially decided to modify a C-87 as a flying classroom in which six student engineers at one time could study four-engine manipulation and cruise control. With production begun, the entire project was moved to Smoky Hill AAB, Salina, Kans., and later to Lowry Field, Denver, Colo., where plans were made to build four more planes like the prototype model. In May of 1944, however, word was received that no more C-87s would be available for training purposes, and it was necessary to seek out a satisfactory substitute.

Accordingly, the B-24J was decided upon as the future trainer, and a prototype plane was designed and handmade in a period of six weeks. The new modification consisted of two instrument panels being placed in the aft compartment behind the bomb bay and another mounted behind the pilot. The

Interior view of B-24 after it was modified to accommodate nine students for training as aerial flight engineers in Superfort crews.

master control station in back of the pilot was placed in backward and throttles and mixture controls were connected directly to the master control station through a series of pulleys and cables. All turrets were removed and the bomb bay was closed, with all hatches and openings being covered over with ¾" plywood flooring. Eight seats and tables were then installed, giving the plane a capacity of nine students, one instructor, a crew chief, pilot and copilot and radio operator. For entrance and exit purposes, the forward right bomb bay door was left connected.

During the months of January and February, 1945, about one trainer per week was completed. Later, however, a production line was set up in which a TB-24 was turned out every three working shifts, or one every one and a half days. The entire project was completed in May, 1945, after two years of planning, procurement and production. Every flight engineer on a B-29 has been trained on one of these planes.

Instrumental in performing the modification were Maj. Joseph H. Frost, Maj. Robert W. Ray, 1st Lt. Georgell Hollingworth, S/Sgt. Jack A. Barnes, S/Sgt. Charles A. Saunders, Sgt. Harold E. Habicht, Pfc. Carrol G. Holzworth and Pvt. Roland P. Strasser.

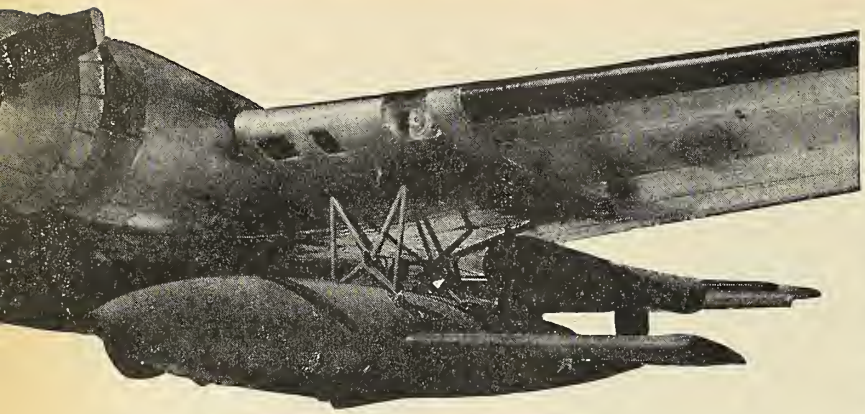
Aerial Robomb Launcher

With a beefed-up wing and a special rack installation that permits two JB2 robombs to be slung under its wings, the B-17 has become an aerial launching platform for the AAF's buzz bombs. A remotely operated fuel valve regulates fuel feed to the projectile's engine, and a control panel, located in the bombardier's compartment, governs starting and launching. There is also an emergency release in the form of an explosive device which blasts loose the hold-on pin and allows the bomb to fall away.

With the robomb in place, the B-17 takes off in less than a mile of runway, with flight performance only slightly reduced and with little effect on maneuverability. During a launching, the bomber climbs to the proper altitude and the bombardier opens the air valve on the bomb, which pressurizes the fuel tank, runs the JB2 autopilot up

what's wrong with this picture?

Rubbing down a plane looks like a soft mission, but unless you brush up on TO 0-1-1, you're likely to make it a complete wash-out. The bucket brigade shown here is all-wet nine times over, but don't shoot off steam on page 55 before you spot another stain or two on their record. The scrub-team—who are posing in good, clean fun—are S/Sgt. Sidney S. Jacobs, S/Sgt. Harold Expensen, T/Sgt. Murt Bedgood and M/Sgt. D. J. Riser, all of 4000th BU, Wright Field.



With a robomb slung under each wing, Flying Fortress becomes aerial launcher. Flight performance is only slightly reduced.

to speed and delivers air to the pneumatic servos. When the plane reaches a speed of 200 mph or more, the jet engine of the robot device is started and allowed to run for about 50 seconds. Then the bombardier trips a simple release mechanism, the bomb drops approximately 500 feet and levels off on its pre-set course.

All materials necessary for modifying the B-17 for this purpose have been included in a special modification kit which was sent to overseas units.

Glide Path Tester

The versatile helicopter now is being used at Wright Field as a test apparatus for calibrating the radio signals of the Instrument Approach and Glide Path Landing systems that bring planes in 'on the beam' for safe touchdown in zero-zero weather. In its new role, the "eggbeater" serves as a flying elevator that enables engineers to find out how far above or below the glide path signals could vary before indicating deflection. By hovering at various levels with a test observer aboard it is possible to study frequencies received during foot-by-foot descent, thus gaining valuable data on descent angles of the beam and the most effective antenna mast setting for more efficient instrument landings.

As explained in the October, 1944, issue of AIR FORCE, the glide path intersects a radio signal that has been sent out to home the plane from a point 15 miles from the runway, and provides a beam on which the pilot can descend through overcast for a blind landing.

XL-13—All-Metal Grasshopper

First of the AAF's light planes to be made entirely of metal, the Stinson XL-13 is a bigger, more powerful liaison aircraft. It has provision for two litters and can carry an overload up to six passengers in a special seating arrangement, while complete radio equipment permits flying in almost any kind of weather, and a small camera hatch facilitates photographic work. In addition, removable panels in the fuselage enable cargo to be dropped through the door of the cabin, and an opening in the floor permits pick-up cargo to be hauled aboard with greater ease than has hitherto been possible. Litters go one above the other along the right side of the plane and are braced by small swinging doors forward and rear.

The XL-13 has a wingspan six feet greater than that of the L-5, and its wing profile differs from that of the other liaison type by having leading and trailing edges parallel at the base and a sharp taper at the trailing edge along the wing tips. The wing has a large flap area on its inner panels, while slots along the leading edge outer section help to make short take-offs possible and slow up landing speed. To make ground handling easier, wings can be folded back and the craft loaded onto a 2½-ton truck for transportation where needed.

A 245-hp Franklin engine drives a small wooden propeller which has controllable pitch blades. The cockpit has dual controls, with wheel-type control columns being used instead of the familiar joystick arrangement. The throttle is a small knob in the center of the instrument board, and the panel is equipped for all the standard flight instruments for blind flying, including a radio compass.

The fuselage of the XL-13 is that of a conventional light plane, except that a tail cone, similar to that on the XR-6 helicopter, supports the empennage. Landing wheels have a spindle arrangement on the vertical strut which makes it possible for the plane to be hauled, trailer-fashion, by a jeep.

Bombing Mission Recorder

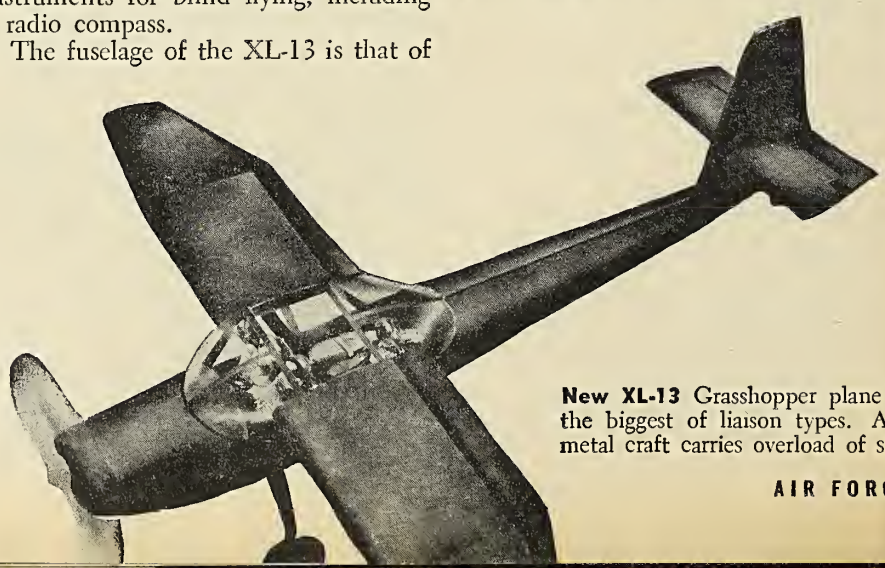
So that a permanent record might be maintained of bomber missions a 32-pound wire-recorder was strapped into the plane to preserve the actual sound and description of a bombing run or aerial attack just as it happened. The instrument is able to "play back" immediately after a recording is made.

Recorder plays back sound and description of bombing mission or enemy air attack as it happened. Cpl. Jean Denter holds mike.

Modifications to Navigation Aids

Three devices have recently been developed as improvements to navigation equipment, which were designed for use in all theaters of operation.

Capt. Quentin R. Edwards, who was General Chennault's personal navigator in China, has devised a simple plexiglas navigation instrument which he calls the Time Milcage Plotter. Consisting of a combination Weems plotter and a time, rate and distance computer, the instrument is constructed on a scale of 1/1,000,000 and is based on a ground speed range of 105 to 225 mph. The



New XL-13 Grasshopper plane is the biggest of liaison types. All-metal craft carries overload of six.

plotter measures courses, determines distanees and computes time-rate-distance problems.

At the 2nd Ferrying Group, ATC, Wilmington, Del., 1st Lt. Paul O. Dannenbaum has instituted a modification to the E-6B computer for use in determining drift by the radio pressure altimeter method. The improvement consists of a latitude scale which will enable the navigator to measure the cross wind component to the heading of his aircraft through an overcast, without the use of tables.

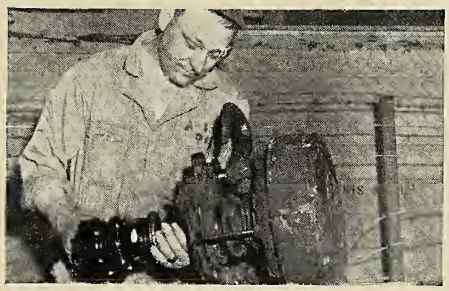
From the AAF Board at Orlando, Fla., comes news of a revision to log form 21A which incorporates the best features of suggestions emanating from the field. The "Observation" columns of the flight record have been moved to a central position close to the "Time" column, while other columns have been arranged to provide a logical sequence both in navigation procedure and use of thc E-6B computer. A complete "Flight Plan" has been included, and one of the revised forms is normally sufficient for an 11-hour flight computed on the basis of observations recorded at 10-minute intervals. It is of a size suitable for use on all existing navigation tables and is further adaptable to any rigid backing that may be devised by the individual navigator.

WHAT'S WRONG with the picture on Page 53

1. The mech with the steam must be in a dream, or he wouldn't be clogging up the carburetor by directing the pressure hose at the exhaust stacks and air scoop.
2. With water and steam flowing freely around the plane, it's strictly taboo to leave doors and inspection plates open, as these men have done.
3. The man at the right is doing a good scrubbing job, but he's strietly out of bounds atop that wing.
4. The gun under the wing and the pitot tube should have their covers on to keep out dirt.
5. Never drape a hose over a movable control surface, as the man with the steam hose is doing.
6. Don't wash airplanes within less than fifty feet of the hangar. This Kingcobra is much too close.
7. Betcha didn't see the rag stuck in the oleo joint on the nose wheel! The man rubbing the plane's nose will undoubtedly forget to remove it.
8. The wing is off limits for that piece of cowling. Then too, the gas caps are open, and our wingman can easily spill water into the gasoline.
9. The small pressure boiler in the foreground uses an open-flame heater, and should not be so close to the airplane.

on the line

with mechs around the world

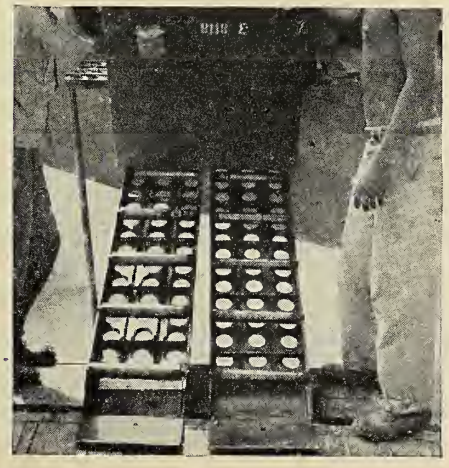


Up to V-J day two-hundred and fifty-thousand pounds of airplane parts were speeded to the Pacific daily from the 2nd Base Air Depot in England with the help of an electrically operated hoist constructed by T/Sgt. Emmett Pfluger of Eden, Texas. When the flow of shipping crates piled up faster than the loading crews could get them onto trucks, Sgt. Pfluger salvaged a B-17 landing gear retraction motor and attached it to a stationary overhead chain hoist by welding a sleeve over its axle and worm gear. An eletrical wiring cord from an inverter relay switch box to the motor transmits power to the hoist. Sgt. Pfluger is shown assembling another such hoist, which enables two men to load twice as much as was formerly possible with twice the number of men.

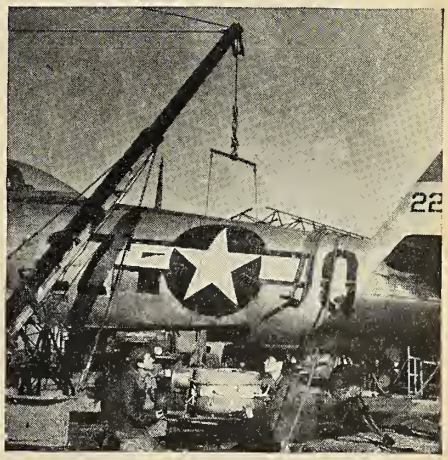
Pvt. William B. Dickerson, Indianapolis, Ind., operates the controls of a home-made sawmill in Burma which he and Cpl. William Brider, Eufaula, Okla., and Pfc. James B. Walton, Townley, Ala., constructed to ease the cut-lumber shortage at their 10th Air Force base. The radiator of the motor is a discarded airplane oil filter, while a jeep motor furnished the power.

Taking a tip from "On the Line," men of the 'Flying Comanche' fighter group in China mounted a K-24 camera on the bomb shackles of a fighter plane, giving the job a streamlined effect by sawing off the stubs of a 75-gallon wing tank and affixing them to the ends of the camera. Lt. Jack M. Fulkerson, Sherman, Texas, and Cpl. Jerry L. Driggers, Sarasota, Fla., performed the installation. "It works perfectly," they say, displaying clear-cut prints of recent bombing and strafing attacks of their Mustang.

During the critical Philippine Liberation campaign, 1st Lt. Maurice Kaufman, Malden, Mass., S/Sgt. Charles Chilvers, Chickasaw, Calif., and S/Sgt. Ernest Walters, Fort Worth, Texas, were confronted with the problem of devising some means for rapidly loading and unloading C-46 aircraft which were arriving at their 4th ASAC depot with inadequate machinery for this purpose. Successfully filling the bill, the men produced a 460-pound ramp consisting of two separate eight foot tracks to accommodate jeeps or light trucks on one side and bulk cargo on the other. For vehicle tracks, perforated landing strip was used, and for crates and boxes, rollers were improvised from water pipe. Ramp can be set up in 3 mins.



At a reclamation and repair squadron in southern Germany, Pfc. Yale E. Goodman, left, and S/Sgt. Guy K. Kline, install a supercharger with the aid of a special lift which the former constructed out of salvaged P-47 armor plate and miscellaneous parts. Firmly secured to the frame of the lift, the 200-pound supercharger is raised and lowered by means of a dual-cabled sling which straddles the fuselage and is suspended from the boom of a shop truck. Time and manpower is saved through the use of this apparatus.



RADAR BOMBING

(Continued from Page 13)

"area" bombing, and since so much of the bombing had to be done by radar, it became necessary for the AAF to revise its program of daylight precision bombing. The great incendiary raids, perfect for radar, began in March and continued unabated right through the rainy season. Pin-point missions were kept for times when it was fairly certain that bombing could be visual; for the rest, the 20th said it with radar.

Radar raids enabled us to do two things: first, to hit urban areas with sufficient accuracy to cause considerable damage, and, secondly, by sheer volume of effort (about 25 times that needed for visual bombing) to accomplish our bombing purpose where, without it, our planes would have been at the mercy of the weather. When the final score was tallied after V-J, blind bombing could certainly take a major share of the credit for the 581 industrial plants wiped out and the 44 cities almost completely razed.

Although even the most devoted radar enthusiast probably will not claim that radar bombing ever was as good as visual sighting, still toward the very end of the war it was undeniably getting plenty good—and there were pictures to prove it.

Ever since blind bombing first began, radar specialists, both civilian and military, have been hard at work in laboratories, at bases, and in combat itself trying to improve the equipment. By the time one set was built, they had at least two dozen ideas for something better. The "something better" was chiefly aimed at getting considerably higher resolution in the scope picture. One such type of new equipment was planned for the ETO, and crews were flying training missions preparatory to using it in combat when the European battle came to a close.

Simultaneously in the Pacific, B-29 crews of the 315th Bomb Group were trying the new equipment on for size. Its formal debut came in July when it was used on four raids against the Utsube River Oil Refinery, the Kudamatzo plant of the Nippon company and the Maruzen Oil Refinery in Shomotsu. Two radar bombing runs from 16,000 feet were officially credited with 95 percent destruction of the latter plant in what Maj. Gen. Curtis LeMay called the best radar bombing of his air units to date.

"Shows what radar can do when it's properly employed," said Col. Stuart P. Wright, former group commander and communications officer of the 20th Air Force, who has helped to pioneer practically every new radar bombing development since the early days of radar vs. the submarines.

In some quarters other veteran radar officers wondered if the new sets were really that good, or if Maruzen was partly luck. In any event, they were inclined to speak of it with a certain reserve lest air force commanders should demand that kind of show every time. Or perhaps they remembered what happened after the 8th Air Force raid on Wilhemshaven in November 1943.

BTO radar was still new in the ETO when that mission came up, so new in fact that the 8th had run but three previous blind missions—two over Emden on September 27 and October 2, using AAF "Pathfinder" planes with British BTO equipment, and a third on Duren on October 20 using British "Oboe" beacon-bombing. None of the three missions did much to strengthen air commanders' faith in radar, but they were still willing to be sold. Wilhemshaven sold—or oversold—them.

Using the first American "Mickey" sets entrusted to on-the-scene-trained radar operators of the 482nd (Pathfinder) Bomb Group at Alconbury, nine B-17 Pathfinders each leading 60 bombers set out for the important North Sea port. Eight visual missions had previously missed the target. The Pathfinders found it by radar, the formation bombed it through the overcast—and demolished it. It was a great day for the radar people and probably did more than any one thing to keep blind bombing on the winter's slate. But subsequent raids never quite matched it and before long skeptics were again mumbling, "Beginner's luck, that's all. Stuff's no good."

Nevertheless the raids, although leaving something to be desired, continued without let-up through the foulest European weather and gave Germany no bombing respite in which to repair her crippled factories. Toward the last, radar bombing was accounting for as many as four out of five bombs dropped.

The MAAF, meanwhile, was giving its own Mickey sets plenty of action. Using coordinated radar and visual bombing, and often assisted by P-38 weather scouts, its bombers levelled many of the Ploesti refineries as well as scores of industrial and military targets in the Balkans, along the Reich's southern front, and as far north as Schweinfurt.

If it made no other contribution in the Battle of Europe, BTO radar paid for itself many times over on D-day when, entirely by radar and through weather that would otherwise have made it impossible, more than a thousand AAF heavies knocked out with pin-point accuracy gun emplacements along the Normandy coast exactly 10 minutes before Allied troops, waiting in landing craft less than 1,000 yards away, stormed ashore.

Assessing radar's role in the AAF and emphasizing its military future, General Carl A. Spaatz has this to say: "So far as the work of the air forces was concerned, the job could hardly have been done without the various radar devices with which we were provided.

"Even so, it was sometimes necessary to classify our employment of radar with the talking dog, which commanded respect not because it talked so well but because it talked at all. Our radar bombing wasn't at all first rate. But radar bombing techniques are still new techniques, undergoing changes and refinements almost daily. . . .

"More and more of radar's tremendous potentialities are coming up for realization as new equipment and new procedures come forth to solve old problems. But all of them put new and continuing demands on operational know-how—and the imagination which gets the most out of that know-how." ☆

THIS IS YOUR ENEMY

(Continued from Page 15)

described abject defeat) announced that "psychologically speaking, the Japanese are still the leaders of Greater East Asia." Asahi was more definite, declaring that the ideal of racial emancipation still gripped the minds of all those Asiatics who had cooperated in the war against the Allies. Years, perhaps decades, dividing the present from this ultimate racial goal might be put to good use. "A worthy race, capable of survival, makes any trial the occasion to set out for new destiny."

Yoshi Muto of the Japanese Broadcasting Corp. addressed the Japanese abroad in the same terms: "We have worried His Majesty to no small extent. But we are now given the chance to test the true power of our race."

Japanese airmen got two final handouts on that historic weekend when the Emperor's representatives transferred from the white planes to the Air Transport Command's C-54 on Ie Shima.

The first, hard-hitting and forthright, was Kusuo Oya's summary of the war. "We did not lose because we were wrong or our thoughts erroneous," he reminded them. "We lost because we lacked material strength. I believe we have not lost to the enemy. . . . We have lost in the battle of the strength of material weapons and in economic power, and we have submitted to so-called unconditional surrender. If we had lost in the spiritual and ideological way also, then there would be no future for the Japanese race. The life of our race is eternal, and I should like to believe that the life of our national policy is eternal also."

The second handout was the valedictory of the founder of the Kamikaze program. Before taking his own life, Vice Admiral Takijiro Onishi addressed himself to the future.

He hoped that young men everywhere would be convinced that "ill-advised conduct invites disastrous consequences." Furthermore, he admonished, such youths as the Japanese airmen should now "attend to peacetime circumstances, maintaining steadfastly the spirit of the Special Attack Corps, doing your utmost to revive Japanese race and world peace."

"Nuts!" the Japanese GI might have said. What two Japanese prisoners of war actually did say somehow makes more sense than Radio Tokyo's blather, the curving syllables of Domei and the interminable word-strings of the orators.

One tired Japanese soldier wrote the war off, "I have surrendered to the joy of just being alive. I hear about men who say they do not wish to return to Japan because they have been captured. Unnecessary obstinacy, I think. Of course, there'll be no flourish about my going back. I'll get home quietly, without any show."

To which a POW companion added, "Home is the place of happiness. You might say that as long as a man is able to go home in safety, he will never know sorrow." ☆

BELOW THE MAST

(Continued from Page 21)

of the vessel at a vulnerable spot. Escape from target was aided by top speed, the low level of attack and evasive action. Low-level flying also proved to be a protection against enemy fighters and a great aid to target identification, especially in avoiding dummy targets.

The strikes out of Okinawa against shipping in Tsushima Strait were attack bombing in its most refined form. The designated groups were alerted, normally four squadrons of six aircraft each. The planes were armed with four 500-pound bombs. Missions were made in two waves of 12 planes each, the first wave taking off 15 to 20 minutes in advance to locate the convoy, providing the second group a saving in gas consumption and a potential increase in time over the target.

The pattern of actual attack runs somewhat as follows: the first wave's initial attack is designed primarily to stop the convoy and neutralize ack-ack. The second wave, guided to target by radio from the first wave, plans its arrival over target just as the first group has completed its attack.

In the attack itself the leader takes stock of the convoy and commits his formation to immediate attack to achieve maximum surprise. He tries to place as many planes as possible over target to the width of the convoy, usually makes the first pass —stern to bow against warships, broadside against merchantmen. The sweep is made at great airspeed, mast high, guns raking the deck. Two bombs usually are released on the first pass. Now the vessels are dispersed and damaged, easier prey to a methodical follow-up attack on single ships.

For the follow-up, the formation normally is split into flights of two aircraft, sometimes single planes.

Attack aviation in the Pacific, a breeder of leadership and discipline, has given rise to a number of outstanding commanders, among them such men as Majors Ralph Cheli and Raymond Wilkins—both Medal of Honor winners—Colonels Joek Hennerbrey, Dick Ellis, Donald Hall, Clint True and Shanty O'Neil.

The attack units are specialists, just as a surgeon is a specialist. Their department happens to be on-the-deck surgery. Unlike a good doctor, they try their best to lose every patient. ☆

Answers to "How Sharp Are You"

Photo on Page 2

Questions on Page 43

1. Propped against landing wheel
2. 18
3. True
4. B-24
5. Three
6. True
7. One
8. Four
9. False
10. False

Roving Paymaster

Pacific atoll pay-off is their main job, doing odd chores back in civilization for island-isolated individuals a sideline

BY S/SGT. JAMES WINCHESTER
Hq, Air Transport Command

Carrying a cool hundred grand in cash, a pair of ATC finance men pack off from Hickam Field once a month to meet the payroll on tiny Canton, Christmas and Johnston Islands in the Pacific.

One month it will be Capt. Alfred Viescas and S/Sgt. Lelon R. Eager, Jr., the next month Capt. James E. Thomas and S/Sgt. James R. Angio. It is a junket of 17 to 20 days, 7,500 miles of riding bucket seats, sleeping on the floors of C-47s, eating at odd hours or not at all.

There isn't much to use money for at a barren spot like Canton or Christmas or Johnston. But Army regulations say soldiers must be paid and, where possible, on time. Since the Army stations on these outposts are too small to have finance offices of their own, a traveling finance officer from ATC's Pacific Division must drop in once a month to walk the ghost around.

There is something like magic in the way the word spreads when the pay plane arrives. The line forms before the finance men can get set. Getting set consists of spreading an Army blanket over a table or box and getting out the money and records. Then the boys file past, drawing the stuff as eagerly as if there were places to spend it.

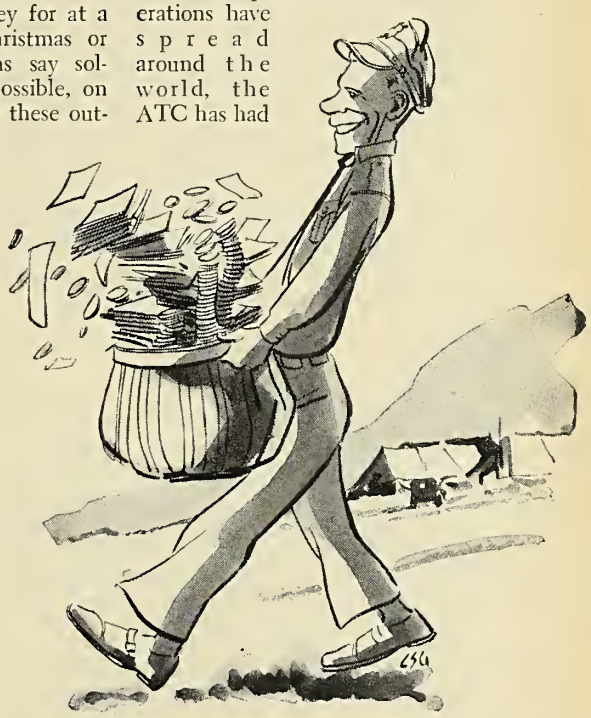
And there are. Within 10 minutes after the payline forms, a poker game—or two or several — is in progress around the island.

"By the time we get ready to leave the island two or three days later there is often one big winner coming around to us with his winnings for us to put into war bonds or savings for him," says Sergeant Angio. "Hardly ever is it the same guy twice in a row."

As the only regular link between the men on these islands and the civilization of Honolulu, the finance men return from each trip with lists of things to do for guys on the islands—messages to deliver, errands to run, calls to make. Sergeant Eager says it always takes him three days to a week to get his personal favor list cleaned up after one of these trips, and Captain Vieseas, by way of saying amen, produced his list from the preceding trip. The items included picking up a set of dog tags for a soldier on Christmas Island, delivering personal messages to 11 people in Honolulu, picking up a camera for a corporal on Canton, getting the laundry of a Canton lieutenant who had shipped out unexpectedly, paying off a note at a Honolulu bank for a sergeant on Johnston, wiring flowers to several girl friends and wives in the States, having five pairs of glasses and three fountain pens repaired.

Nor are all the extra-curricular duties unofficial. The finance officers serve as postal inspectors, checking up on the postal facilities at each of the islands they visit. And not quite so officially, they are, in the words of Vieseas, "couriers, chaplains' assistants and sewer inspectors."

As its operations have spread around the world, the ATC has had to face money problems of many kinds. It is ATC policy to pay troops and native labor in the currency of the country in which they are stationed, and there are nearly 100 ATC bases scattered over the world's crossroads. This has necessitated setting up a worldwide banking and foreign exchange system dealing in the currencies of 36 countries. Finance officers have been recruited from foreign exchange departments of the largest U. S. banks.



A travel-weary pilot who is rather a whiz at gin rummy recently presented himself to his finance officer with a collection including Canadian dollars, British pounds, Portuguese escudos, two kinds of French francs, Egyptian piastres, Iranian rials, Indian rupees and Chinese dollars. He exchanged the assortment for a wad of American greenbacks. ☆

Berlin Post Mortem

Carrying wood home in a go-cart, these Berliners pass what remains of building which housed Goebbels' Propaganda Ministry.

BY CAPT. TOM SILER

AIR FORCE Overseas Staff

Berlin is the most bombed city of the European war by an overwhelming margin. On a percentage basis, the city is not as beaten up as Hamburg, Cologne or Frankfurt simply because of its immense area. Many factories were untouched by bombs, thousands of dwellings are intact, but the factories producing priority materials—aero engines, guns and bullets, locomotives, electrical supplies, oil refinery equipment, tanks and shells—were plastered repeatedly.

The strategic air war on Berlin was a model of cooperation and coordination between the RAF and USSTAF. Add to this a few air attacks by the Russians and one spectacular bombing by the Italy-based 15th Air Force. These combined forces rained well over 75,000 tons on Berlin, finally breaking the morale of a people thoroughly regimented and helpless in the iron grip of the Nazi war machine.

By late 1943, the RAF was sending over great fleets. On March 4, 1944, the 8th Air Force jumped into the battle, gradually growing stronger until as many as 1,300 Forts and Liberators bombed Berlin in a single daylight attack. Three months later, RAF Mosquitoes began their relentless surprise raids, at one time visiting the city 36 nights in succession. Once into the Berlin air battle, the 8th used 8,718 bombers to drop 21,788 tons of bombs, sending along 11,563 fighters as escort in the 19 missions to the city. Over Berlin alone the 8th destroyed 855 Nazi planes, with a loss of 282 bombers and 180 fighters.

This massive effort against Berlin was not the work of vengeance. Air attacks were not retaliation for the bombing of London. There was only one major factor involved: Berlin was the greatest single target of strategic importance in the Reich. It was the capital of Germany, headquarters of the government and the party, but far more important, its industrial output was much larger than that of any other city. It contained one-tenth of all the high priority factories. Its population was 4,400,000. Two-thirds of its working population was engaged in war production. Factories destroyed or severely damaged run into the thousands. Add to this the piles of dust and rubbish that once were the striking cluster of buildings which housed the Chancellery, Air Ministry, Propaganda Ministry, Gestapo Headquarters and others and you have irrefutable evidence of how strategic bombing of Berlin shortened the war.

The Berliner Zeitung recently estimated that Berlin would have to cart away more than 50,000,000 cubic meters of trash and rubble before it could even start to rebuild. The news account said that in the city proper 800,000 buildings were either destroyed or badly damaged and that 10,000,000 trucks or 3,000,000 railway cars would be needed to carry off the crushed pillars, shattered houses and buildings, twisted girders and burned out buildings. ☆

800,000 buildings destroyed or badly damaged—that is the picture today in the most heavily bombed city in the European theater

The Reich's transport and railroad stations were wrecked by the continuous raids of the AAF and RAF. At one time 448 trains left Berlin daily; by the end of March the number was 39. Over 50,000 workers were busy constantly restoring even partial service.

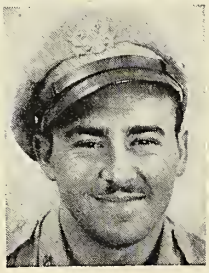
Germany's highly centralized government was a target as well as the industries concentrated in the city. Above are ruins of Hitler's chancellery with its famous balcony barricaded. Other buildings of the Nazi administration got even worse treatment from our bombers.

The Intercom

As a medium for the exchange of ideas, AIR FORCE presents these answers to its Question of the Month. Replies are those of personnel recently returned from combat duty in the areas indicated.

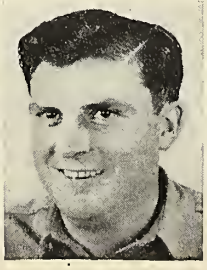
QUESTION: What type of personal plane would you like to own after the war?

Capt. John Godfrey, pilot, 8th Air Force: "I want a small single-seater plane that would be easy for acrobatics. I don't get any fun out of flying straight and level—anybody can do that. I want a plane I can really push around. A 400-mile range is enough because there will be plenty of airfields and you won't have any trouble finding a place to refuel. Between 175 and 185 mph would be enough speed and $3,000 ought to pay for it. I'll never get tired of flying and if I had the money that is the kind of an airplane I would buy. Just keep it without any doodads."



1st Lt. Donald Smith, pilot, 13th Air Force: "I want a single-engine job. I have flown twin-engine planes for so long now that I'm tired of them. And the plane would have to be capable of high speeds—I'd consider about 200 mph a fair speed for my purposes. There should be room for three passengers but only one set of controls—I don't want any back seat driving. And it should have at least a 1,000-mile range so I could make long non-stop flights. I don't want to be going up and coming down all the time. I would use it for both business and fun, like an automobile."

Sgt. Eugene Pitts, ground crew, 15th Air Force: "I would like a two-passenger plane for economy and ease of operations. Eighty-miles-an-hour cruising speed is fast enough for me. There is no need to go any faster in a private plane. The whole idea is to take it easy and see the country. I like the security of a twin-engine job; if anything goes wrong with one engine, you still have a chance. I think that $1,000 would be a fair price for such a plane, and maybe a little cheaper. The small plane is going to replace the automobile and there won't be any stoplights."



Cpl. Milton J. Wynne, special service, 15th Air Force: "I'm an artist, and I want a personal plane to take me to places where I can find good subject material for my drawings. It should be small and speedy, and a kind of a plane that will take off and land on postage stamp fields. I want to draw Americana, and my plane will have to move in and out of the back country and out of the way places. And I want an automatic pilot arrangement so that I can sit back and draw even while I am flying. I've heard of flying doctors and flying salesmen and I want to be a flying artist."

1st Lt. Joseph Becker, antiaircraft, 10th Air Force: "Give me a five-passenger plane. If your plane is too small, you can't carry anyone and if it's too big, the gasoline and upkeep charges will be too expensive. A five-passenger plane is a happy medium. I want only one engine. It certainly is just as safe and the repair costs would be much less. I think there should be some oxygen sets in the plane so I could get pretty high. I really want to do some flying. My guess right now is that about $8,000 should cover the cost once the aircraft plants start producing them on a production line."

1st Lt. Joseph Briccola, pilot, 13th Air Force: "I want two personal planes. One for speed, to see the country, and one for pleasure. For a fast plane, I think I'd like a jet job if they are on the market. And for just flying around, I would buy an AT-6 from the government. Then I would hire a ground crewman from the AAF to soup up the engine so that I could cruise at about 225 mph. With a powerful engine, the AT-6 will be plenty of airplane for me. I learned to fly with that plane and I'd like to use it after the war. And I'll bet I could get one without paying too much for it."

LONG LEGS

(Continued from Page 18)

at the very end of the strip, Young took the signal, gunned his engines and started down the runway. He was airborne at the very end of the strip. The other 39 got off safely.

It was a long ride. Several planes experienced engine trouble, some turned back because the pilots knew they wouldn't have enough gas; other pilots bailed out and were picked up by Navy rescue Cats.

But 24 reached the target, one formation in three hours and 30 minutes, another in three hours and 55 minutes, the third in four hours and 20 minutes. Jap fighters, expecting uneseorted bombers, evidently were thrown into confusion by the presence of the fighters. Seemingly without a defensive plan, the enemy attacked singly and without coordination. Eighteen Jap fighters were shot down, with the loss of one of our own, and the B-24s were able to carry out their mission with a minimum of interference. From takeoff to landing back at Morotai, some of the planes were in the air eight and a half hours.

Four days later the fighters went back, this time about twice as many. Some of the pilots who had flown the first mission flew again. This time they bagged 35 enemy planes, with five probables. We lost five fighters, only one by enemy action. The others came down in the water and the pilots were rescued.

After that the Japs relied on antiaircraft guns to defend Balikpapan, seldom sending up any interceptors. The bombers were no longer troubled by Jap fighters.

On October 14, six 13th Air Force P-38s, led by Lt. Col. Leonard Shapiro, reached out even farther. The target was still Balikpapan but this time the fighters were flying from the Middleburg base. Using 165-gallon belly tanks, they flew a round trip of 1,900 miles, and broke up a Jap formation, shooting down two and damaging two others.

Fighter missions of seven, eight, even nine hours were becoming SOP. They ranged in all directions, striking from the southern Celebes to the central Philippines. Support was given various Philippine landings. Thousands of tons of shipping were sunk by the long range fighters. In February, 1945, they struck at the coast of China, spreading destruction from Hongkong to Amoy.

In June, 1945, on a search mission out of Morotai, 15 P-38s were in the air up to 11½ hours. And by July Lightnings of the 13th's Sunbusters Group flew nearly 2,100 miles on a mission over Singapore.

It was a long trail from Moresby to Okinawa, and the fighters helped blaze every foot of the way. Europe had its fighter problems, and they were solved. The vast overwater distances of the Pacific presented peculiar problems, and they too were solved.

After his capture, in Europe, Goering exclaimed that American long range fighters were the biggest surprise of the war.

On the other side of the world, Jap warlords could sigh and say, "Ain't it the honorable truth?" ☆

RENDEZVOUS

(Continued from Page 36)

two combat missions of 18 hours, 10 minutes, and 17 hours, 40 minutes respectively. B-24s, equipped for long range antisubmarine operations, were utilized. Purpose was to give all-night coverage to the "Empress of Scotland," which traveled without surface escort. . . .

It might be of interest to note that the airborne radar equipment on the two aircraft functioned successfully and continuously for 15 and 14 hours on these missions.

W/O E. G. Keener,
Langley Field, Va.

Dear Editor:

In reading your ever popular AIR FORCE, we came across a particularly interesting article in the February issue, entitled "Fighting 13th." Among the many targets bombed by the 13th, Balikpapan seemed to be stressed. We know the 13th is doing grand work and deserve great credit, but we believe something is being left out.

According to a 5th Air Force bulletin, the 380th Bomb Group, better known as the "Flying Circus," was credited with not only the longest mission until the coming of the B-29 to this theater, but the first over Balikpapan.

An August 14, 1943, the 380th pulled a surprise raid over this target, bagging approximately 40,000 tons of shipping without the loss of an aircraft. The journey covered 2,620 miles round trip and our planes were in the air from 1645 to 1715 hours. The same conditions were experienced as were with the 13th, but with much less preparations.

How about giving the Flying Circus its due?

Four Originals of the Flying Circus,
APO 321.

Refund

Dear Editor:

As a faithful follower of AIR FORCE and a firm believer in the thought that it takes skill to create and lack of understanding to find error, I have been somewhat hesitant about writing this note. However, as an attorney and legal officer, I know that you would want me to call this one item to your attention.

In the August 1945 issue, the feature, "Questions on Policy and Procedure," contained a query regarding the assessment of money penalties for minor derelictions without aetion by court-martial or under Article of War 104. Although the answer correctly stated that a court-martial or action under Article of War 104 is necessary, the Article of War 104 aspect was not fully explained, resulting in an erroneous sketch showing a brigadier general taking half the pay of a private first class. The fines under Article of War 104 may only be imposed upon company grade officers and not upon enlisted personnel. Therefore, your Art Department will have to arrange for the general to give back to the private first class his pay forfeiture.

In closing, I would like to add that I have found the AIR FORCE to be a great aid in its publicizing of various matters that have arisen regarding policy and procedure.

Capt. Herbert Bialosky,
Pyote, (Texas) Army Air Field.

The PFC is herewith reimbursed.—Ed.

Sound Practice

Dear Editor:

One of our major problems while operating from recently bombed and recaptured airdromes during the late fall and early winter was mud and refilled holes.

Taxiing over this kind of terrain not only caused us severe tire, brake, and excessive engine run-up maintenance but cost the life of one pilot and caused a serious handicap to the copilot.

The pilot of the C-47 was taxiing normally, when the left wheel of his plane became stuck. Attempting to dislodge it, he applied full left throttle. This succeeded in pulling the plane over its first obstacle but . . . instead of rolling, the wheel buried itself in another hole which was recently refilled and still soft. This caused the prop to strike the ground (at approximately 2,500 rpm) breaking the prop hub and throwing one of the blades through the cockpit, killing the pilot, maiming the copilot and destroying the cockpit beyond repair.

We have found that a policy of cutting the throttles *immediately* upon being stuck and awaiting the "cleat track" is a very profitable one, even though it might seem inconvenient at the moment.

1st Lt. Arthur C. Kane,
APO 744, N. Y.

The office of Flying Safety says Lt. Kane's idea is sound and should be practiced by all pilots. A few minutes' delay is sounder behavior than attempting risky action to get out of a potentially dangerous situation. By all means, wait for the "cleat track."—Ed.

Wrongside Up

Dear Editor:

On Page 16, June issue of AIR FORCE, there is a sketch illustrating proper bail out procedure from a German fighter. The written instructions below the sketch say to push the control column forward to make the plane nose down. Shouldn't your sketch be flying right side up to do this?

Pvt. Rollin Sturgeon,
Squadron H, Lincoln AAF, Neb.

Right. Our artist was in a tailspin.—Ed.

PICTURE CREDITS

FRONT COVER: T/Sgt. Roger Coster, AIR FORCE staff photographer. 25: Consolidated-Vultee Aircraft. 44-45: Sgt. Norman L. Pratt. 58-59: S/Sgt. Ben Rosenblatt. All other illustrations secured through official Army Air Forces and Signal Corps sources.

FLYING FOR FUN

(Continued from Page 27)

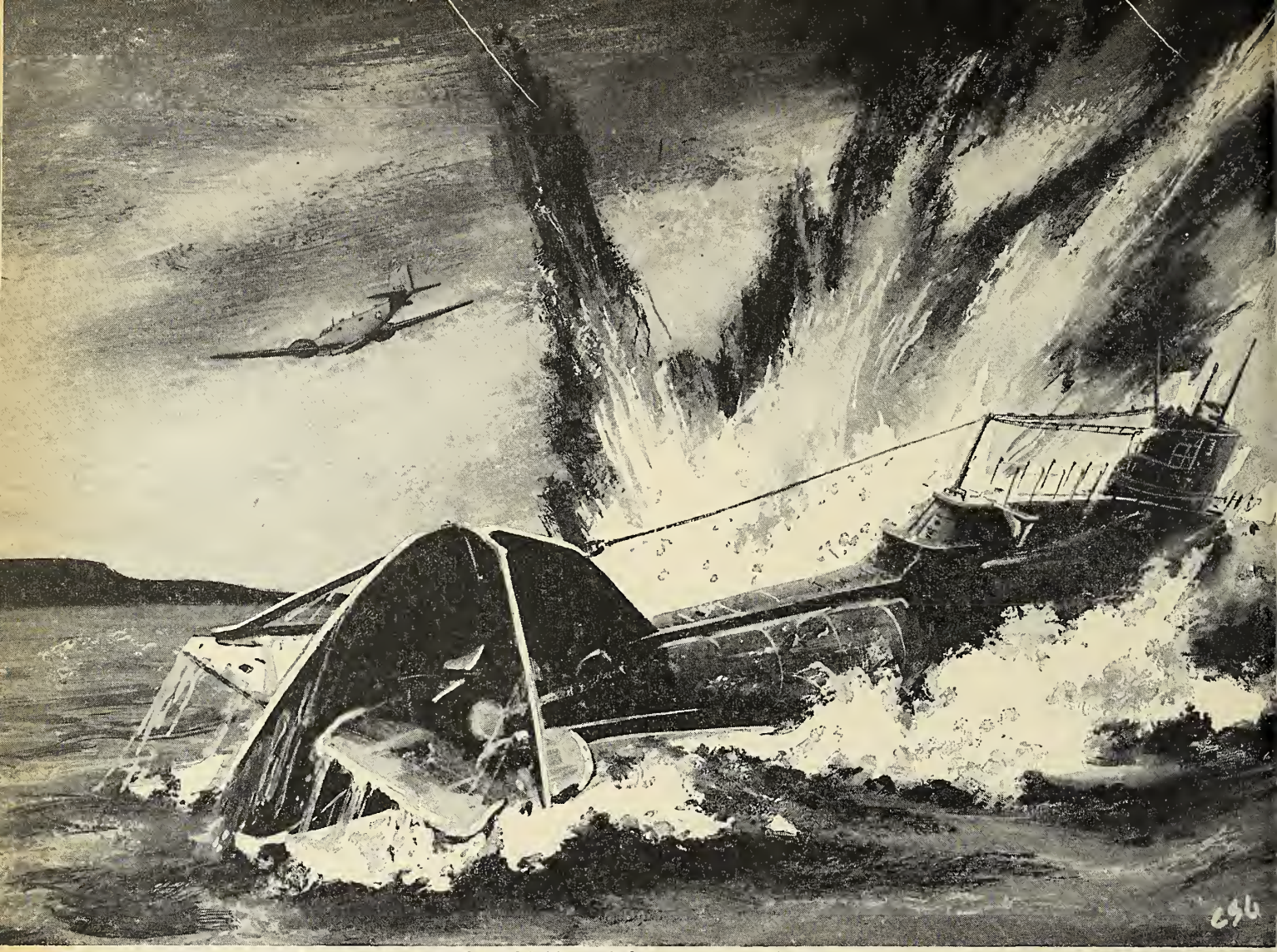
powered aircraft, accumulated after receiving the rating as a glider pilot

Otherwise, it is necessary for liaison and glider pilots to obtain additional time until 200 hours are accumulated. Then a written examination and a flight test are required.

A word of caution. Before most CAA officials go to bed at night they earnestly pray that no hot-shot pilots will apply for a license. If you have an insatiable desire to fly under a bridge, it is hoped that you will go build a bridge on a desert and fly under it to your heart's content. But don't pick on any bridge that has been erected in the past 10,000 years. And if you don't like the mayor of your town and want to buzz the City Hall, you'd better make up your mind it may be your last flight. If it is proved that you have endangered life or property, your certificate will be suspended. There will be considerable air traffic in the postwar world and when Grandma is flying the kids down to the ice cream emporium, she may not be able to get out of the way of a cantankerous cowboy in an airplane. And there is no reason why she should have to. ☆

Answers to Quiz on Page 46

1. (C) Boom tail design
2. (D) White Face Mountain, Vt.
3. (A) Railway tracks
4. (C) Dual intermeshing rotors
5. (D) 0 to 10,000 feet
6. (B) One mile long and ¼ mile wide
7. (C) Warning set
8. (B) 1907
9. (C) Instrument for measuring power
10. (A) Port of Aerial Embarkation
11. (D) Sedative for personnel
12. (B) Process for color-printing photographs
13. (B) Term used in aerial photography
14. (B) May 14—August 17, 1943
15. (B) False
16. (A) 3,000 miles
17. (A) True
18. (D) Converted Liberty ships
19. (A) B-24 with a single rudder
20. P-80



From bases in the equatorial jungles, bombers of our Caribbean air force smashed at the Nazi U-boat packs that threatened the Panama Canal.

6th AIR FORCE

BY CAPT. JOSEPH D. GUESS
AIR FORCE *Overseas Staff*

Many of the men who wear a galleon above the wings on their shoulder patches to represent the 6th Air Force may sometimes feel that they have fought a forgotten war. Yet they belong to the oldest of all our overseas air forces and, since more than a year before Pearl Harbor, their air force has been on 24-hour alert in some of the hottest, most rugged terrain in the world.

While no enemy fighter plane has ever appeared in their sights, flyers of the 6th have seen their guns grow warm. The subs got so bold back in 1942 and 1943 that they stopped submerging when flushed and began fighting it out with the water-skimming patrol bombers. The subs had what it takes to fight with—plenty of heavy caliber machine guns and 20-mm and larger cannon. The 6th has a sobering record of missing aircraft.

You can glance at operational reports and see such entries as these: "B-18C sights surfaced sub which fires AA and MG. Plane drops five depth charges, sub submerges," or, "Eleven aircraft fired on by subs . . . ," or "Enemy sub fires on aircraft circling to bomb; aircraft damaged, forced to retire." The report could go on. But enough subs, in turn, were sunk or damaged to get rid of them long ago.

The 6th, however, continued on guard with utmost vigilance. Everyone realized that the Panama Canal—protection of which was the primary job—had been one of the Western Hemisphere's most strategic assets. And when the entire combat job had shifted to the Pacific, it became more vital than ever. The enemy realized what he could accomplish by sneaking a few planes into the canal area. So the 6th, under the command of Maj. Gen. William O. Butler, settled down to the monotonous job of securing the skies over the water and jungles.

The 6th also undertook additional tasks which were important in the prosecution of the war in other theaters.

In July of last year, when the sub danger was well in hand, Brig. Gen. Edgar P. Sorenson, then the Commanding General of the 6th, suggested to Headquarters, AAF, that the Canal Zone would be ideal for absorbing combat training crews into existing tactical units for on-the-job training—especially if the crews were destined for theaters which had extremely unpredictable weather and jungle hazards.

Some of the B-24 and P-38 bases were literally hacked

Snakes and submarines have been the chief foes of this little-known Air Force to the south

out of the jungle. Surrounding on every side are mangroves and other vegetation so thick a person can't budge his way through. There have been cases when flyers have had engine failure or other trouble, parachuted (forced landings are usually out of the question) in sight of a base, and yet died before rescue parties could hack through.

The jungles in Panama and some other Central and South American countries within the 6th's current zone of operations, are not very pretty places. True, you might see some of the world's rarest birds, many-hued and brilliant in color, and interesting types of not too vicious monkeys. But a man stranded here would be more concerned with the over-abundant supply of poisonous snakes, such as the bushmaster, from four to eleven feet long, aggressive, deadly poisonous; or the fer-de-lance, from three to eight feet, highly poisonous; or the boa constrictor, perhaps fifteen feet long, which isn't poisonous but is capable of squeezing a man to death. There are scores of snake types, all more or less aggressive and poisonous, and extra large alligators.

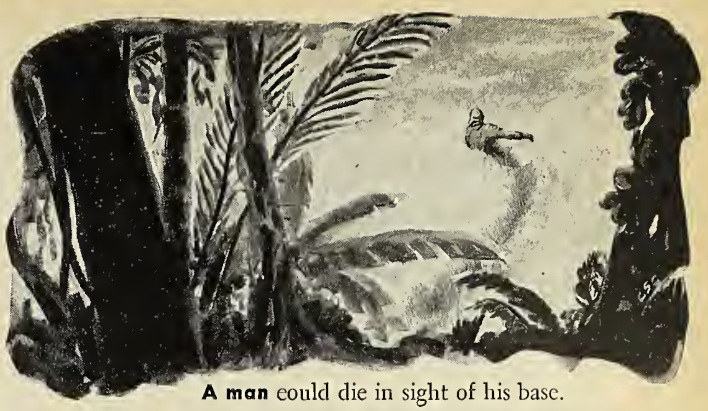
Needless to say, a man has to be pretty well equipped and trained to have a chance in such a country. Not that the 6th Air Force men are forced to take daily strolls through such places. But they do fly above these jungles and encounter sudden rain-squalls, thunderheads and fronts which invalidate all forms of navigation and may cause most anything to happen. So upon arriving in a jungle squadron, a new man, whether a trainee or a new member of the permanent party, gets some specialized instruction. He puts on chemically treated clothing, high boots, gloves and headnets, swabs his face and hands with ointments, is shown how to wield a machete or jungle knife against animal or snake, and is conducted on overnight jungle hikes. Ground personnel also get some of this training.

Before the war with Japan ended, about one-fourth of each fighter and bomber squadron were trainees, who would fly on to combat areas after getting the equivalent of the three-month, three-phase training schedule of commands in the States.

In the matter of training, the 6th is greatly responsible for sponsoring air-mindedness in Central and South American countries. From the Air Force School of the Military Training Center of the Panama Canal Department there have been graduated men for the air forces of Peru, Colombia, Venezuela, Ecuador, Chile, Brazil, Nicaragua, El Salvador, Costa Rica and Guatemala. Nearly every month sees at least a small group of flyers and ground men from our neighbor countries get their wings or certificates. Officers and enlisted men are trained in armament, communications, navigation, gunnery and combat flying. The First Brazilian Fighter Squadron, which made a fine record in Italy, was trained here.

Navigation was tough on jungle patrols.

Particularly an agency of good will in this air force is the 20th Troop Carrier Squadron, which, besides having a hand



A man could die in sight of his base.

in teaching flyers of neighbor countries, has a dozen other jobs. Rather than transporting troops, it is primarily a freight-carrying and mercy mission outfit. Hardly a week goes by without a civilian from one of the nearby countries or an air force or other Army man depending on the 20th to save his life. If someone at an isolated village or airbase has acute appendicitis or gets bitten by a coral snake or mauled by a jaguar, a pilot of the 20th likely has to climb out of bed in the middle of night to do an emergency evacuation—and he might have to land his plane on anything from a strip of beach to a wide space in the jungles.

This one workhorse squadron also figures big in the 6th Air Force because it flies mail and supplies and shuttles personnel back and forth between more than a score of jungle bases. It makes travel easy and quick where there are no highways or railroads. It also has set up an international airlines to supply and provide transportation for U. S. Army air missions in nearly every South American country. To do this, it is now flying regularly, with sadly inaccurate maps and only a few radio aids, over many thousands of miles to some of the world's most treacherous areas—the Andes Mountains and the Amazon Valley. Some of the 20th's veteran pilots have each completed more than 2,500 hours' flying time during their tours. And the squadron has had its own submarine troubles. The Germans used to surface, ride the same radio beams the squadron used, and fire on any low-flying transports.

One advantage enjoyed by flying personnel of the 6th is the occasional chance to land in Costa Rica, Guatemala, Peru or some area with a pleasant climate. But there are ground personnel—cooks, mechanics, clerks and others—in the isolated little bases who have been jungle-bound for two or three years. Men often remark, "Until you have been here two years, you are a new man."

But not long ago a new policy called for rotation of combat training crews to the United States after 12 months and permanent party personnel after 24 months, and Japan's surrender was expected to cause further changes.

Compared to what they were at the beginning, the 6th's jungle bases are now nicely livable, if you think in terms only of eating and sleeping and working. Food is good; there always seems to be cattle country close enough to supply plenty of choice steaks. Beer, liquor and rum are generally adequate. During the dry seasons, the screened and windowless barracks catch plenty of breeze at nights. There is likely a beer garden and an officer's club and a movie on the base. And, probably, a few miles down a scraggly little road, a tiny village and one fly-filled bar.

These bases are small. But taken all together they form a powerful fighter and bomber defense of the canal. They fit into a highly co-ordinated and maneuver-tested plan of dispersal and air control. The Panama Canal, from the standpoint of both air and ground weapons, is one of the world's most strongly defended areas, and you have only to fly over the area with its airbases to realize what reliance is placed upon airpower in guarding this military prize. ☆

SHOOTING THE BREEZE

Got any good stories?
Send 'em in!

China. Most Chinese pilots are much smaller than the average American airman, and this difference in physical stature gave rise to a unique assignment of "ratings" among these pilots in the Chinese-American Composite Wing. The Chinese flyers used cushions to assist them in reaching the rudder pedals of their aircraft, with a natural result that some billiard fan soon began gauging them as one-, two- or three-cushion pilots. In combat, however, size proved unimportant when a three-cushion man was credited with three and a half Jap planes in a single air engagement.

USA. An obviously disturbed old lady rustled into military police headquarters in a western city recently to complain about what she described as "the disgraceful conduct" on the part of a group of Army chaplains she had observed going into a house near the downtown district on successive Saturday nights.

"I could see dancing and drinking going on inside," she exclaimed, "and I don't believe that's any way for chaplains to act. I think you ought to do something about it."

The MPs promised the visitor they would look into the matter, and on the following Monday the old lady was back again to learn of the results.

"I'm sorry, lady," the desk sergeant said. "We went around to the address Saturday night and we couldn't find a chaplain anywhere in the neighborhood."

"Why you must be mistaken," she exclaimed. "I went back there myself and I saw dozens of them going in that house. I know because they all had those little churches on their collars."

"That house" had been the Engineers Club.

Pentagon. It was one of those high-level, policy-making "long-hair" offices. During the war three of the officers in it had to get the prescriptions for their glasses changed, and others occasionally went TDing overseas with brief cases strapped to their wrists. Came V-J and, although their point scores were low, most of the officers were of sufficiently mellow years to be granted relief from active duty.

One day their commanding officer called them in for one of those Pentagon conferences. The CO was very pleasant; he knew exactly how the men felt now that the war was over. And despite the fact that there was still a lot of advising and planning to be done, he would not stand in the way of an eligible officer's relief from duty—provided each man on leaving would have found a replacement of "suitable qualifications and of equal talent and ability."

Apparently their last assignment had been their only impossible one in the Army. Weeks later, all the officers were still in uniform.

Kyushu. Taking time out from their job of helping reinforce fortifications along a spot of sacred coastline which Jap intelligence figured was a likely landing spot for American invasion forces, two Nip soldiers hunched over their rations of rice and fish heads.

Between crunches, one soldier turned to the other and inquired cautiously, "Have you heard about the atomic bomb?"

"Yes," his companion whispered. "When are we going to use it?"

Burma. Some time before the liberation of Allied prisoners of war in a lockup near Rangoon, a B-29 tail gunner captured after a bailout was being grilled rather harshly by a Jap interrogation officer. The questioner stalked the floor in front of his bound prisoner, obviously attempting to think of a query that would open the mouth of his stubborn victim. Suddenly he wheeled and inquired, "What do you think of the B-29?"

After a moment's hesitation, the sergeant replied cockily, "I think it's a damned fine airplane."

The Jap officer looked furtively behind him, leaned across the table and whispered: "So do I."

ETO. It's not often that we become concerned with the activities of civilians, but war correspondent photographers—well, you just can't help paying some attention to them.

Shortly before the end of the war in Europe, a news photographer, with a solid reputation around the world, was having his difficulties out on the line with a public relations captain lately from headquarters and quite nervous. Every time the photographer wanted a picture, or a jeep, or a case of 10-in-1 rations, the captain would refuse the request.

Finally, the photographer, a big-bearded fellow and very impressive, started poking a finger in the captain's chest. "I want you to know something," the cameraman said. "Some people have allowed that maybe I'm the best combat photographer in the world. I might be and I might not be, but I've never heard anyone say that you're the best captain in the world."

Manila. One of the Jap emissaries in town for the initial surrender negotiations stopped by a PX to buy some American cigarettes. The GI back of the counter was surprised when the Jap handed him a 10-dollar U. S. bill—but not nearly so much as the Jap when the clerk returned the change in Jap yen. ☆

The Album

DISTANCE FLIGHTS

Orville Wright flew this from Ft. Myer to Alexandria, Va., a good five miles, in 1909. Time beat two horses, one Reo.

These pioneers, Lts. J. A. Macready and Oakley G. Kelly, made the first non-stop, California-New York flight in 1922.

Round the world in 176 days in 1924 got these men Collier Trophy, DSMs, claustrophobia. Left to right, Sgts. Turner, Ogden, Lts. Arnold, Wade, Smith; Maj. Martin, Sgt. Harvey.

Lt. R. L. Maughan flew this Curtiss PW8-D12 Curtiss 450 from New York to San Francisco in 1924. Elapsed time was 21.48.30, the flight was enthusiastically called "daylight."

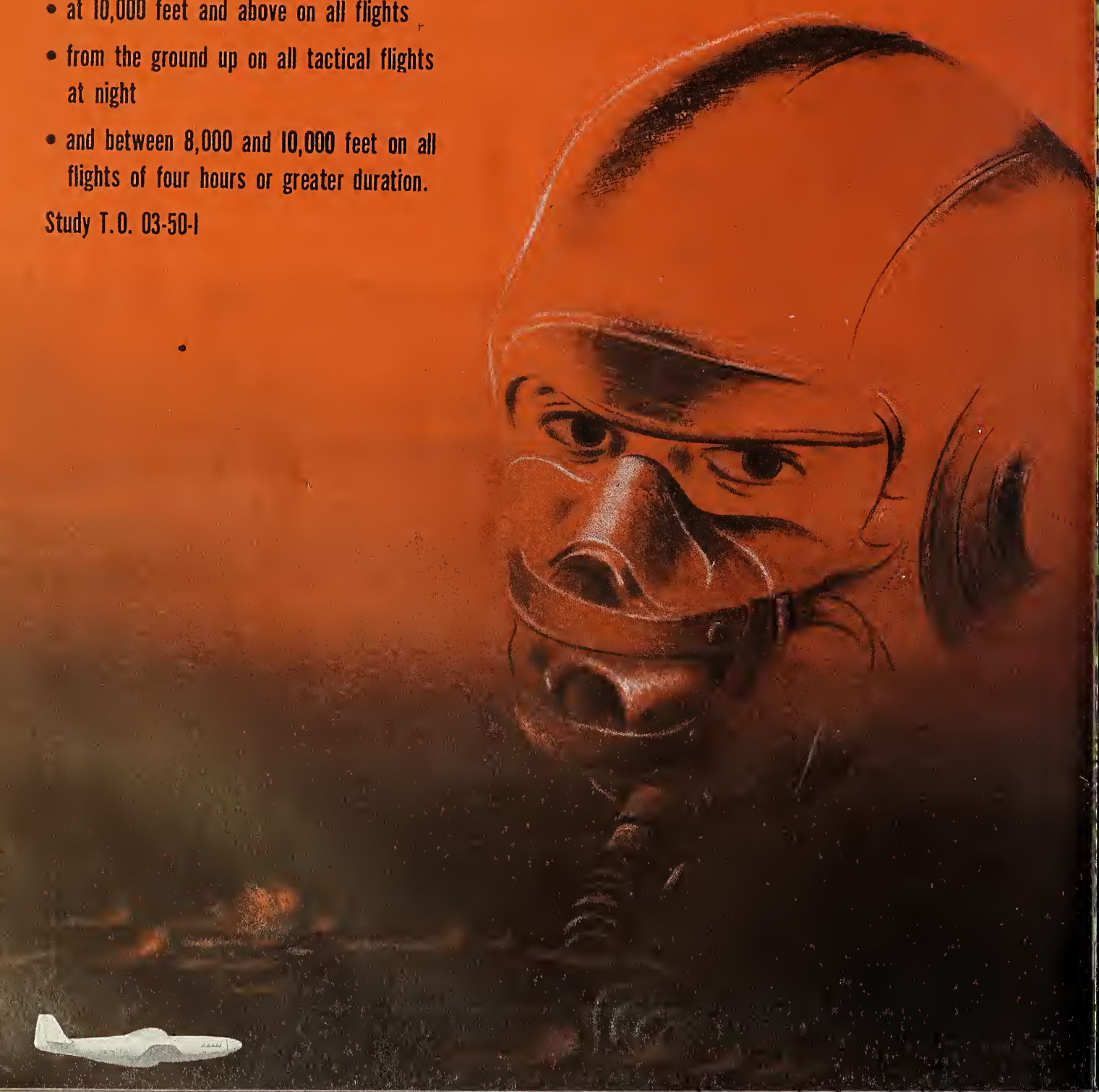
A lot of present-day rank was in this flight from Bolling Field to Fairbanks, Alaska, in 1934. Kneeling: Capts. John D. Corkille, Harold M. McClelland, Ray A. Dunn, Westside T. Larson; Lts. Ralph A. Snavely, Nathan S. Twining, John S. Mills, Hez McClellan. Standing: Lts. Lawrence J. Carr, Charles B. Howard; Majs. Malcolm C. Grow, Hugh J. Knerr; Lt. Col. H. H. Arnold; Maj. Ralph Royce; Lts. John S. Griffith, Leonard F. Harman. Colonel Arnold was awarded the Mackay Trophy for commanding flight.

the BATTLE against ANOXIA isn't over!

Anoxia is an ever-present danger in flight. Combat this enemy by being alert, by using your oxygen

- at 10,000 feet and above on all flights
- from the ground up on all tactical flights at night
- and between 8,000 and 10,000 feet on all flights of four hours or greater duration.

Study T.O. 03-50-1



AIR FORCE

THE OFF[illegible]RNAL OF THE U. S. ARMY AIR FORCES ☆ NOVEMBER 1945

JAN
NATIONAL

INSIDE JAPAN: Spaatz, Kenney and kibitzer

"*Butterfingers!*"

"*What would you charge to make this into a snappy bell boy's uniform?*"

Manila Miseries

BY CAPT. WM. T. LENT
AIR FORCE Staff

"*But Elwood, I'm sure you drop accountability on those six unused set screws.*"

"*Maybe this will teach you to barter with these natives.*"

"*You should have been here when it was really rough —no refrigerators!*"

Rendezvous

Boost for PIs

Dear Editor:

Much has been written concerning the photo recce flyers and units, but little about those who complete the job begun by the photo recce outfits. The taking of the photograph is merely the first step in a long and tedious job, a job the importance of which is often underrated or ignored altogether. Credit should be given those officers and men who by their skill and hard work make the photos divulge intelligence. This is not to demean these courageous pilots and crews who take the pictures, but rather a meager attempt to gain some recognition for those taking up from where the actual photo mission stops.

Photographic interpretation requires long hours of intense study, close scrutiny for detail, comparison with photos taken previously, and finally results in intelligence from which decisions on targets are reached. In the Asiatic theater especially PI is the mainstay of the A-2.

PI located and evaluated the installations in use by the enemy, it found the supply dumps, factories, repair centers and troop concentrations. It determined the construction of targets so that bombing missions could be set up using the type of bombs and attack best suited without the waste of trial and error methods of attack. It determined the terrain and the best approach to the target to avoid the most flak and prevent detection by the enemy radar. It located and typed the enemy aircraft, and in several cases was the first agency to discover new types of models of aircraft, ships, or defense installations. It determined the damage accomplished on a target so that the necessity for additional strikes could be determined.

I could go on and on in the same vein, but that isn't my job. I am merely a PI assigned to a Wing. Having seen only one article about PI, and that about its role with the ground forces, I felt the urge to request that due recognition be given the photographic interpretation detachments and their personnel.

Capt. Joseph T. Carey
312th Fighter Wing
Chengtu, China

Stamps for Wounded

Dear Editor:

When we organized STAMPS FOR THE WOUNDED just a year ago, we thought that if we could help servicemen in about 25 hospitals, we would have been quite successful in our venture. The idea of using stamp collecting as a form of recreational therapy under the guidance of the Red Cross, however, was so well received and did so much to cheer the men that we are now working in 74 Army and Navy hospitals.

We have sufficient volunteers, but unless we get many thousands of more stamps, I'm afraid we will not be able to carry on. During the first year so many executives of

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Vol. 28 No. 11 November 1945

AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

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business firms thought so well of our project that they caused notices to be distributed to their employees and this produced supplies enabling us to distribute 4,000,000 stamps. Entering our second year we estimate this number must be doubled if some men are not to be disappointed, so may I ask that you cooperate with us by running a plea in your magazine?

Ernest A. Kehr
Stamps for the Wounded
230 W. 41st Street
New York 18, N. Y.

Tomatoes and Morning Glories

Dear Editor:

Have read with interest your article entitled "Vegetables on the Half Shell," (September, 1945, Cross Country) but disagree with the statement that "AAF personnel could not raise so much as a dandelion on Ascension Island." As early as March, 1943, AACS personnel stationed on Ascension had excellent results in the growing of tomatoes and morning glories, the only two types of seeds then available. Seeds were either germinated in agate wash basins or British helmets, transplanted to areas around tents and watered from the meager supply of rationed water (after it had been used for washing purposes). The greatest drawback at that time, as I recall, was the multitude of rats which constantly gnawed at the small seedlings.

Capt. Clarence J. Christman
LaGuardia Field, N. Y.

Make It the 93rd!

Dear Editor:

Banzai! Someone has definitely SNAFUed here. Although your magazine is unusually accurate with respect to all technical material, and mistakes therein are few and far between, this one I know to be an almost inexcusable error. Some things we can take with a grin, usually a sickly one, but this? Never!

It all came up in your September issue. In the article, "Three Years Over Europe," on Page 43 Major Gordon says, "In December (1942) it (the 97th Bombardment Group) had been joined by three squadrons of Liberators from the 92nd Group in England." Now names I can be called without any trouble, people can push me around at

How Sharp are You?

This study in international relations took place at the Air Transport Command base at Nome. You may remember the picture which appeared in AIR FORCE about a year ago. Look at it for 60 seconds, studying everything from uniforms to positions, then turn to Page 33 for the usual 10 questions. When you've chosen your answers, turn to Page 46 to see how you came out. With 10 points for each correct answer, 100 indicates a genius—at pool, anyway; 90 very good indeed; 80 all right; 70 not much help around a service club, and 60 and below, better stick to bridge.

HOW SHARP ARE YOU? . . . . . Turn to Page 33

times and not get slugged, but, partner, when an article appears saying that the 92nd had those flying boxcars for combat planes, them's fighting words. YB-40s we did have for a while in the 327th Squadron, but not those pregnant cows. I joined the outfit in the summer of 1942 as a ground crewman and went over with them from Dix that August. After I got on combat I flew with Lts. Bogart, Larson and McGrew until we were shot down on that Stuttgart raid in September, 1943, which takes in the time-period that Major Gordon had in mind. I can assure you that no Libs were in our group up to that time.

Now, do we get an apology or do the Harrisons and the Straubels start a feud?

S/Sgt. T. D. Harrison
138th AAFBU, Sq. F, LCAAF
Lake Charles, La.

Dear Editor:

Hats off to you and Maj. Arthur Gordon, but . . . it was not the 92nd; it was the 328th, 330th and 409th Squadrons of 93rd Group, commanded then by Col. E. J. Timberlake.

S/Sgt. R. E. Howell
267th AAFBU, Sq. A, Box 5328
Ft. Sumner, N. M.

Dear Editor:

. . . I was with the 93rd Bomb Group, 328th Squadron, at that time and I know that the group sent to Africa in December with three squadrons and operated from both Oran and the desert side was the 93rd Bomb Group and not the 92nd as your magazine states. As a member of the 93rd, I'd like to see the credit for hard work and a good job go to the boys who did it, not to a group that wasn't even in Africa.

Lt. Luther C. Cox
AAF P.D.G.
1045th BU Sq. H
San Antonio, Texas

We'll take the rap, men. No feuds, please. We're outnumbered.—Ed.

Berth Control

Dear Editor:

Being an ardent devotee of my colonel's issues of AIR FORCE, I read them thoroughly. In the October issue on Page 25 in the article "Flying Hotel," I was particularly surprised and amused at the amazing services and accommodations the commercial design of the C-99 provides, namely: "9 staterooms and 12 births." What? That number every trip? The stork is a busy bird.

Capt. D. N. Dalton, WAC
1709 Washington Ave.
St. Louis 3, Mo.

Why, there's nothing to it. The stork has a permanent berth *aboard this remarkable airplane. And, incidentally, our proofreader has one of the same in our populous doghouse.—Ed.*

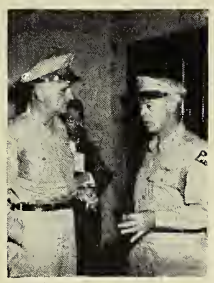
Ventilator

Dear Editor:

As a B-29 flight engineer I have found the airplane uncomfortable flying at low altitude (500 to 4,000 feet) in hot weather because the cabin air flow system does not

(Continued on Page 46)

In This Issue



Whatever General George C. Kenney is telling General Carl Spaatz in this month's front cover photo, it isn't brightening the sad expression on the face of the Japanese bystander. This informal conversation between our two top air commanders in the Pacific is taking place in front of a lobby elevator of the New Grand Hotel in Yokohama, General MacArthur's temporary headquarters shortly after our landings at Atsugi Airdrome on the city's outskirts. This picture, together with most of the photographs in "The AAF Inside Japan" (beginning on Page 4), was snapped by Lt. Benny Reyes of the 5th Combat Camera Unit, who landed on Atsugi in one of the advance C-47s two days before our formal occupation of the Tokyo area began.

With Lieutenant Reyes' photos, which he brought back to the States aboard the first B-32 to return following the initial occupation, is a word picture of "The AAF Inside Japan" supplied by Maj. Robert V. Guelich and Lt. Harvey F. Yorke, AIR FORCE overseas staff correspondents on the scene. Major Guelich, who will be remembered by AIR FORCE readers for his coverage of technical developments at Wright Field and a productive stint in the CBI theater two years ago, recently returned to our New York office with a batch of interesting information which will be put to worthwhile use in our special issue on the war in the Far East to be published in December. Lieutenant Yorke remained in Japan where he was joined by Maj. Ben. J. Grant, chief of our Far East Branch, and, later, by Capt. William T. Lent, who were to complete coordination details for our special Pacific issue before returning to New York. Meanwhile, Capt. John C. Jay has arrived in Manila to join our Far East staff.

☆

On the other side of the world, Capt. A. E. Hotchner has delved into the organization of the education and recreation program for our occupation personnel in Europe. His impressions of this ambitious undertaking are included in the article, "Battling the Occupation Blues," on Page 20. Captain Hotchner writes that he has just visited the British Isles where he found most of the former bustling bases of the 8th Air Force to be little more than ghost towns. "Only 30,000 of our boys remain," he says, "and most of them have their trunks packed." Captain Hotchner comments, however, that the wholesale exodus has been a boon to the thirsty. "The Royal George, Fox & Hounds and other favorite haunts now have more than enough mild and bitters on hand for all comers," he writes rather gleefully.

When we published a chronology of AAF units which had received Distinguished Unit Citations in our March, 1945, issue, many readers commented on the comparative scarcity of citations for our air units in the Pacific. The same was true of citations covered in subsequent issues of AIR FORCE as they became official. This chronology included citations officially recorded at AAF Headquarters up to January 1, 1945, except those which could not be revealed for security reasons. Some of the latter had to do with distinguished action by our Pacific airmen, and dozens of other Pacific units subsequently were cited by General Kenney, commanding general of the Far East Air Forces, as the war against Japan drew to a close. To bring our coverage up to date, AIR FORCE this month is publishing a summary of these citations according to the dates of action. "Battle Honors in the Pacific" (Page 34), is little short of a thumbnail history of the air war in the Southwest Pacific from the days of Port Moresby to the front door of Japan.

☆

Capt. Leslie Caplan, the "Death March Medic" (see Page 12), is now hospitalized as a result of malnutrition and exposure to disease while a prisoner of war in Germany. Captain Caplan is attempting to collect data on casualties resulting from the march through Germany, which he describes so graphically in his article, and he requests that any men of Section C, Luft IV, who have any information on casualties, to communicate with him at Ward 4, Fitzsimons General Hospital, Denver 8, Colo.

☆

As a sidelight on THAT current topic of conversation, one of the officers whose job it is to see that men returning from combat theaters are getting all the points coming to them has written us an article on his experiences in getting the other fellow back in civvies. He is Lt. Edmond D. Boles of the AAF Reception Center at Camp Beale, Calif., whose contribution, "Seeking Stars," appears on Page 48. ☆

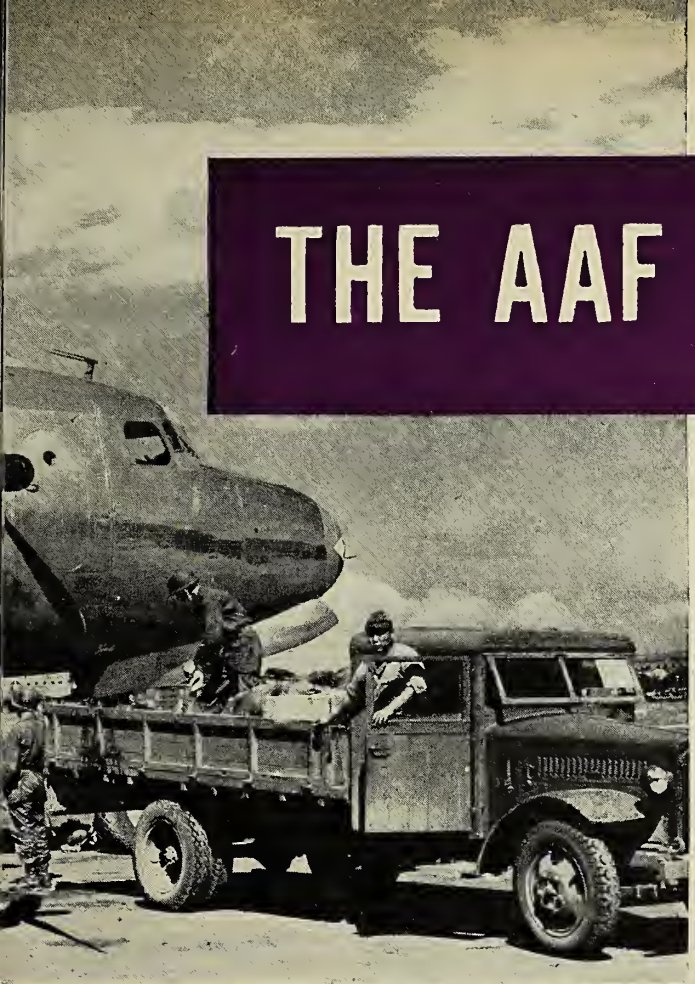
VICTORY EDITION

The Army Air Forces' role in beating back the Jap and leading the way to final victory in the Far East will be described in the December issue of AIR FORCE. This coverage will include on-the-scene observations of AIR FORCE staff correspondents in Japan, the Marianas, Okinawa, the Philippines, China and India.

Ready to transport occu
pation forces to Japan
C-54s jam hardstands a
Okinawa as part of lar
gest armada of its kind

THE AAF INSIDE JAPAN

By Air Force Overseas *Staff Correspondents*



Jap trucks help unload C-54s quickly so they can take off as soon as possible, making room for others in Atsugi's limited parking area.

Representing General MacArthur in first day's talks, Col. C. T. Tench confers at Atsugi with Gen. Arisuye, Imperial General Staff.

The typhoons had vanished over the China Sea and in the morning light the long runway of Atsugi airdrome was a deserted highway leading to the heart of a conquered empire. Near the hangars and buildings and along the perimeter, Jap soldiers stood docile and expressionless as the wheels of an American C-47 slammed onto the hard-surfaced strip. Thirty-six other aircraft marked with the white star of the AAF curved into the traffic pattern, carrying some 150 technicians of the 5th Air Force. Above this fleet of transports, American fighters criss-crossed protectively, alert for any signs of treachery.

It was August 28—0828 hours, to be exact—and Z-Day was still two days in the future. That was when the 11th Airborne Division was scheduled to begin its bloodless invasion of Japan. But with clearing weather, it was decided to send an advance aerial party to Honshu to prepare for the large-scale occupation to come.

Thus the seizure of the Japanese mainland really started when the C-47 rolled to a stop at Atsugi. As crew and passengers emerged, the Japs at the field were witnessing the first occupation of Japan by an enemy force in more than a thousand years.

The pilot was Col. John H. Lackey, commander of the 317th Troop Carrier Group. If he had any doubts about the welcome that awaited his party, they were soon dispelled by the Jap officials on the Atsugi "reception" committee.

The Americans arrived in the role of conquerors, and their vanquished hosts met them with obsequious grace. Dining tables, with spotless table cloths and vases of flowers, had been set up in the mess, and Lackey and his men were given a dinner of fish and beer, cucumbers, tangerines and sliced pineapples.

Assured that the Japs at Atsugi were ready to cooperate fully in setting the machinery of surrender into motion, most of the American transports returned to Okinawa that afternoon. The men remaining behind immediately went to work to prepare Atsugi, 22 miles from the capital and largest airfield in the Tokyo network, for the Z-day landings.

Main task of this advance party—well protected by Japanese naval and civilian guards—was to install a communications system that could handle the forthcoming aerial invasion. Personnel of the 68th Army Airways Communications Group had designated this job as "Crash Project Number One," and most of their equipment was flown in and unloaded within an hour after Colonel Lackey's C-47 landed. (See "Contact on the Double," Page 28.)

In that first hour, the men had an emergency homing beacon in operation, and early the next morning they finished installing permanent tower equipment. By sundown

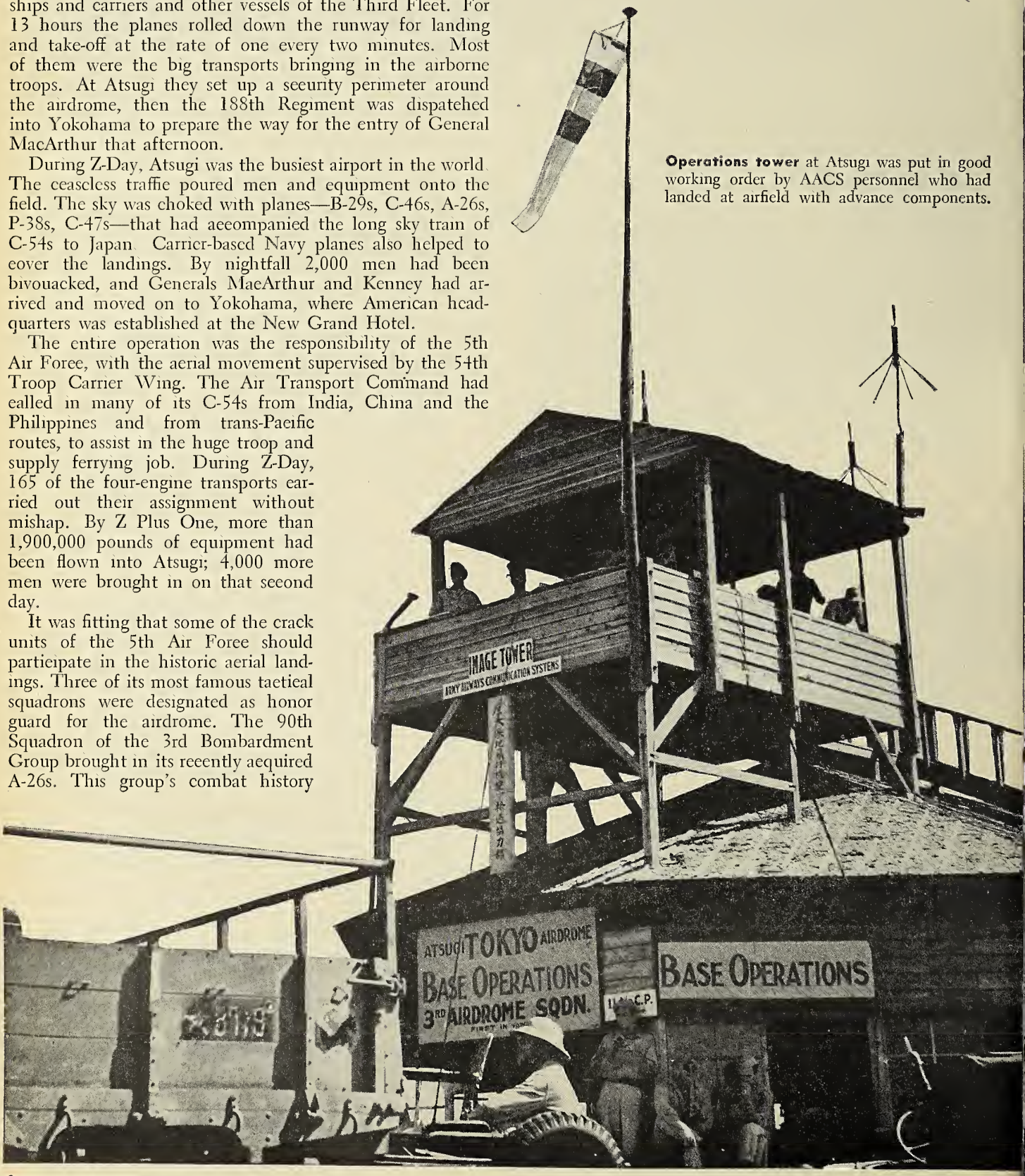
of the 29th everything was in readiness to receive the occupation air fleet.

At 0600 on Z-Day the first C-54, carrying troops of the 11th Airborne, settled on Atsugi's single, 5,200-foot runway. All day the planes flew across Tokyo Bay, above the battleships and carriers and other vessels of the Third Fleet. For 13 hours the planes rolled down the runway for landing and take-off at the rate of one every two minutes. Most of them were the big transports bringing in the airborne troops. At Atsugi they set up a security perimeter around the airdrome, then the 188th Regiment was dispatched into Yokohama to prepare the way for the entry of General MacArthur that afternoon.

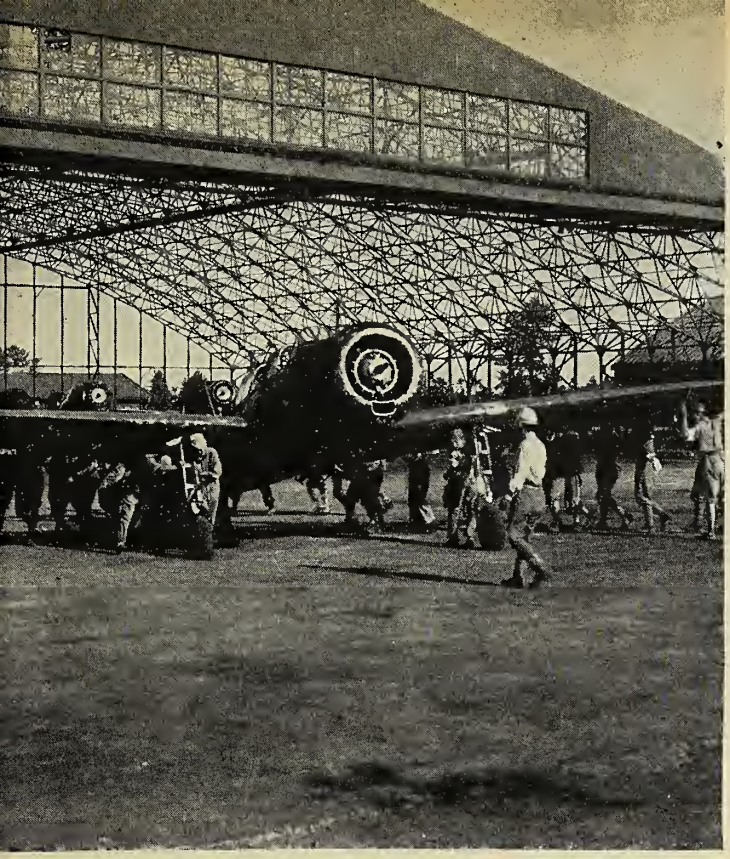
During Z-Day, Atsugi was the busiest airport in the world. The ceaseless traffic poured men and equipment onto the field. The sky was choked with planes—B-29s, C-46s, A-26s, P-38s, C-47s—that had accompanied the long sky train of C-54s to Japan. Carrier-based Navy planes also helped to cover the landings. By nightfall 2,000 men had been bivouacked, and Generals MacArthur and Kenney had arrived and moved on to Yokohama, where American headquarters was established at the New Grand Hotel.

The entire operation was the responsibility of the 5th Air Force, with the aerial movement supervised by the 54th Troop Carrier Wing. The Air Transport Command had called in many of its C-54s from India, China and the Philippines and from trans-Pacific routes, to assist in the huge troop and supply ferrying job. During Z-Day, 165 of the four-engine transports carried out their assignment without mishap. By Z Plus One, more than 1,900,000 pounds of equipment had been flown into Atsugi; 4,000 more men were brought in on that second day.

It was fitting that some of the crack units of the 5th Air Force should participate in the historic aerial landings. Three of its most famous tactical squadrons were designated as honor guard for the airdrome. The 90th Squadron of the 3rd Bombardment Group brought in its recently acquired A-26s. This group's combat history



Operations tower at Atsugi was put in good working order by AACS personnel who had landed at airfield with advance components.



Jap laborers move one of their planes, partially dismantled on General MacArthur's orders, to clear shore for occupation supplies.

These American POWs, captured on Corregidor and imprisoned near Kobe, walked and hitch-hiked the 550 miles to Atsugi in 22 hours.

Parking apron of Atsugi was crowded with C-54s on first occupation day. Jap ambulances at left, ready for emergencies, were not needed.

dates back to January, 1942, when it arrived in Australia, later evolving the tactics of low-level attack, first in A-24s and B-25s, then in A-20s. The squadron was led onto the field by a former commanding officer of the "Grim Reapers" group, Col. Richard H. Ellis, who had flown 203 low-level missions against the enemy.

The heavies were represented in the Atsugi landings by B-24s of the 43rd Group's 63rd Squadron. This group had compiled an imposing record of nearly 1,000,000 tons of enemy shipping sunk. It was this squadron that flew the only B-17s in the Pacific after the 19th Bombardment Group had been disbanded. The man who led the B-24s into Atsugi was Col. Edward W. Scott, Jr., who had brought the first "Snoopers" to the Pacific and had developed the successful tactics of radar night bombing and long-range search and armed reconnaissance.

U. S. flag goes up on a hangar at Atsugi as our troops arrive.

Fighters moving in on the airdrome were P-38s of the 49th Group's 9th Squadron, led by Col. Gerald Johnson, leading AAF fighter pilot in the Pacific at the close of the war, with 26 enemy planes to his credit. This squadron is the one with which Maj. Richard I. Bong ran up a score of 40 enemy planes; at one time it also had Maj. Thomas B. McGuire, who was right behind Bong with 38 kills. The 9th Squadron first campaigned with P-40s in the defense of Darwin. Later, using Lightnings, it fought over Port Moresby and was the first air force unit in Hollandia, Biak and Leyte. From there it moved on through Mindoro, Luzon and Okinawa.

With them were many of the AAF's unsung veterans of the Pacific war. Besides the AACS group, they included air freight forwarding teams of the 21st Air Service Group and the 63rd Air Service Group, outfits that had been among the first to set up large-scale supply bases in the Pacific. These planes and men formed the spearhead of our occupation force. From Atsugi, the men who went on to Yokohama rolled over dirt roads in convoys of Japanese trucks, through miles of rubble and wreckage.

While surrender papers were being signed aboard the USS Missouri on September 2, 400 B-29s flew overhead; thus the final surrender was figuratively punctuated by the big planes that had dealt the knockout blows of the war.

The AAF's role in first phases of occupation was not finished, however, for when the southernmost mainland island of Kyushu was taken over, aerial units were first to land. Technicians and engineers were flown in from Atsugi on September 3, the day before the U. S. 6th Army went ashore. These technicians and engineers prepared for the arrival on the following day of airborne troops. Later, the 22nd Bomb Group (M) and the 8th Fighter Group were selected as the air occupation units for the island of Kyushu, which was to have been one of our key invasion points in the Japanese home islands.

The 5th Air Force, which had been designated as the occupation air force for Japan, assumed further duties on September 8 when the occupation of the American zone in Korea got underway. Tabbed for the Korea assignment were 308th Bomb Wing headquarters, the 42nd Bomb Group (M), the 475th Fighter Group and a part of the 317th Troop Carrier Group. A 13th Air Force unit, the 42nd, was being transferred to the 5th Air Force.

Back on the main island of Honshu, the Tokyo area was scheduled to include the 310th Bomb Wing headquarters, the 3rd Bomb Group (L), the 35th and 49th Fighter Groups, the 375th Troop Carrier Group, the 8th Photo Squadron and the 82nd Tactical Reconnaissance Squadron; the 38th Bomb Group (M) and the 475th Fighter Group were to move in farther south near Osaka, and the 309th Bomb Wing was to take over the air job in the northern section of the island.

These units were forming the nucleus of the AAF's occupation force which, according to a recent estimate by Lt. Gen. Barney M. Giles, commanding general of the U. S. Strategic Air Forces in the Pacific, will number from 30,000 to 40,000 men and 800 planes. ☆

This Yokohama landscape is typical of the scenery that greeted our occupation troops as they moved through Japanese cities to their permanent bases. B-29s, which the Japs called "the Birds of Hell," had literally blazed a trail through mile after mile of buildings.

Japs are incurable shutterbugs, and military defeat gave these local officials a chance to be photographed beside one of our giant C-54s.

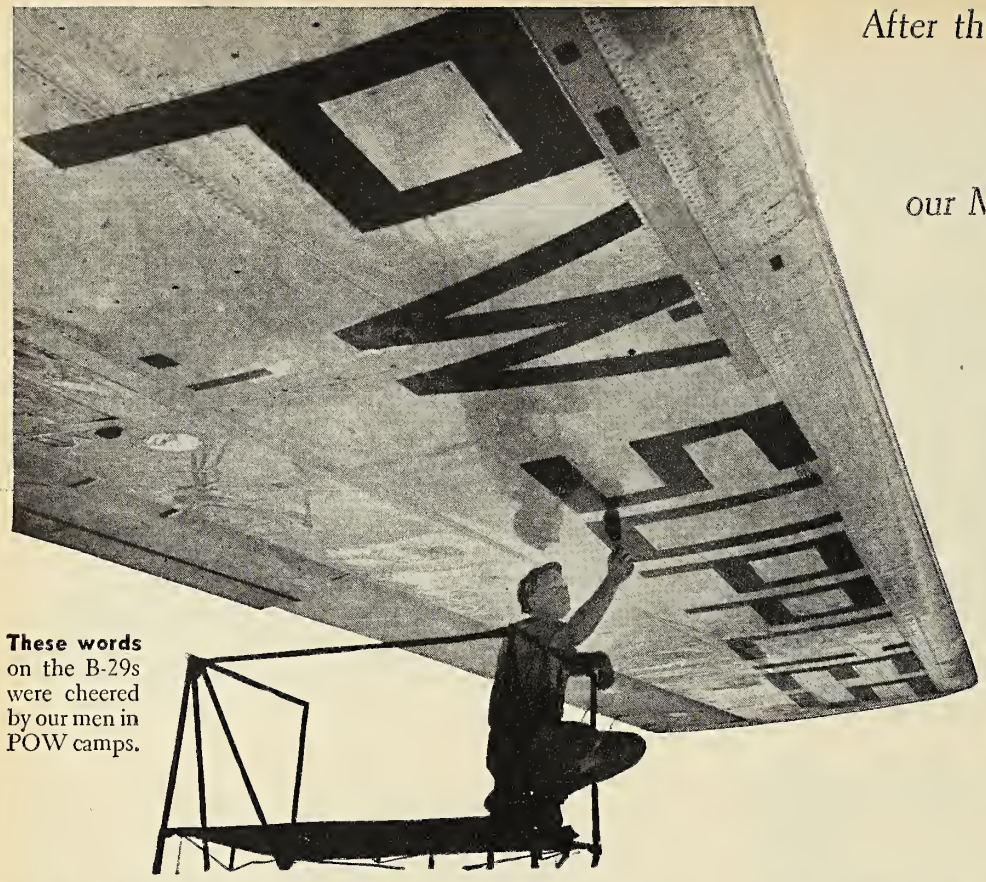
A Japanese citizen drinks water from a broken pipe in the charred business section of Tokyo devastated by Superfort attacks.

Life returns to a battered and razed section of Yokohama as war ends. Laborers unload rice sacks at a government warehouse.

General headquarters of the occupying forces, New Grand Hotel at Yokohama, is ringed by arms of the 11th Airborne Division.

General MacArthur pauses with Generals Spaatz and Kenney at edge of Atsugi airstrip shortly after his arrival there on August 30.

After their last cargo of destruction had fallen on Japan, our Marianas-based B-29s loaded up for new targets—food, medicines and clothing for Allied POW camps



These words on the B-29s were cheered by our men in POW camps.

Superfor

When the Japanese bowed and handed over their Samurai swords on August 15, the problem of how to get foodstuffs, clothing and medicine quickly to thousands of Allied prisoners of war in Japanese prison camps was paramount in the minds of Allied commanders. This was a job that had to be accomplished immediately. It was more than just another phase of the occupation, it was a mercy mission—the greatest in history.

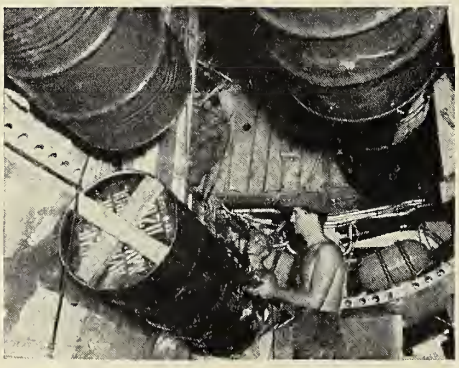
Two-thirds of the POW camps were in the Japanese homeland. B-29s for months had been flying hundreds of miles across the Pacific to bomb targets sometimes uncomfortably close to POW camps. It was logical then that Lt. Gen. Nathan Twining's 20th Air Force should be given the task of getting supplies to prisoners of war. The B-29s could get there "fustest with the mostest."

Operations sections in all five Marianas-based B-29 wings went into action, and five days before peace was signed on the battleship Missouri in Tokyo Bay, B-29s had begun spread-eagling China, Manchuria, Formosa, Korea and the four main Japanese home islands with medicine, foodstuffs and clothing for Allied prisoners of war.

Some of the B-29 crewmen had never been on a mission over enemy territory before, and POW camps were not exactly the size of Tokyo. Army and Navy intelligence had chartered the positions of most such camps but there still were many which we had been unable to locate. Low-flying Superforts briefed on missions to known compounds found others and split their supplies between the camps accordingly. One camp of 12 starving nuns was discovered near Beppu, Kyushu, by a Chicago newspaperman.

In addition to these mercy missions, the 20th Air Force played a vital role in the occupation preparations of the Jap homeland. More than 200 weather reconnaissance flights in the Marianas and over the empire were flown. Two hundred and fifty-four "air-lift" sorties carrying freight from the Philippines, the Marianas and other Pacific islands to advance bases were made. Seventeen photo-reconnaissance missions to Japan were flown to complete damage assessment of targets for which there had been no post-strike coverage. Low-altitude pictures of port and dock facilities in northern Honshu and in southern Hokkaido were made for the Navy so that occupation forces could move in with

Cargoes of food, clothing and medicines were checked carefully before loading began.



Many of the supplies were packed in oil drums and hoisted into the bomb bays.

'Mercy' Superforts parachuted 7,000,000 pounds of supplies to Allied prisoners.

Signs on rooftops in the POW camps left no doubt of their identity for our B-29 airmen, or the gratitude of the starving prisoners.

Samaritans

BY CAPT. GORDON O. CULVER
20th Air Force

minimum difficulty. Low-altitude movies were taken of Japan's burned out cities and, though they were flown prior to the actual signing of the surrender, no opposition was encountered on these missions. The 3rd and 41st photo-recon squadrons of the 20th Air Force later were engaged in making complete photo coverage of the Marianas for the purpose of preparing accurate maps of that area.

The five B-29 wings—the 58th on Saipan, 73rd and 313th on Tinian and the 314th and 315th on Guam—participated in the POW missions dropping 11,000,000 pounds of supplies on more than 150 POW camps. In all, 1,000 sorties were flown in the Superforts with specially constructed cargo platforms in the bomb bays.

The mercy missions were planned as first aid for the starving and disease-ridden prisoners to tide them over until American liberation forces could free them. Some camps were visited two and three times. The first drop on each camp contained sufficient supplies for three days. If a camp was not liberated at the end of that time a second drop with enough food for seven days was made. If a third drop was necessary, food for 10 days was parachuted down. After Allied prisoners of war at Ofuna, described as the hell hole of Japanese prison camps, had received enough supplies to take care of their needs they begged B-29 crews not to drop any more. They didn't want the Japs to get what would be left behind when they were liberated.

A B-29 carried sufficient food for 200 prisoners. Eighteen bundles were loaded in each bomb bay and the drops were made from less than 1,000 feet. Targets were designated by furrows, paint or cloth panels on the ground. Two-thirds of the supplies were dropped on camps in the Japanese home islands.

The plotting of POW camps so that crews could be briefed properly and the corralling, packing and loading of supplies was a tremendous undertaking. The hub of this activity was centered at Isley Field on Saipan with the 73rd wing. Superforts from all the wings brought in supplies from sub depots at Guam and Saipan to augment those at the depot on Saipan where they were packed.

Many of the supplies were dropped in used fuel drums. Service crews, who called themselves the "Saipan Samaritans," welded two barrels together into what looked like "blockbusters." Three eight-hour shifts were maintained to make sure that a sufficient number of barrels was made available. In all, 1,800 drums were welded. Flight crews helped in loading the planes.

The Guam-based 315th wing flew so-called "air-lift" missions to the Philippines bringing back 24,000 cargo chutes. None were available in the Marianas. The same wing flew three of the longest POW missions to Mukden, Manchuria, a round trip of 4,000 miles.

For days prior to the first mercy mission's take-off from Saipan, armament, ordnance and parachute packers labored on preparations to insure success of the drop on the compound at Weihsien on the Chinese Peninsula at Shantung. A test drop made at Isley Field proved unsuccessful. Some of the chutes failed to open and supplies were too badly damaged for use. Repacking of the chutes began immediately.

The oil drums filled with supplies were anchored to the bomb racks by the same shackles that had once been used to secure bombs. As on bombing strikes nothing was left to chance. The bombardier, navigator and radar operator combined their efforts to determine the exact moment for "supplies away."

Some B-29 crewmen, fresh from Stateside, were participating in their first Pacific mission. Trained to deal out destruction, they found themselves on errands of mercy. From low level, these new crewmen observed the devastation of Japanese cities left by the Superforts when their missions over the empire had another purpose.

While anticipating no trouble even before peace was signed, the mercy planes carried ammunition for their guns —and as one crewman put it, "there wasn't a dud in a carload of the bombs we were carrying." The first POW supply drop was made on August 8, and less than a month later there remained only three compounds which might need another visit before liberation troops reached them. These three camps had food to last through September.

Four Superforts were lost on the mercy mission operations. Two aircraft disappeared and were never heard from, a third crashed into a mountain in Japan and a fourth was shot down over Korea by Soviet planes—a case of mistaken identification. In the latter case, no casualties resulted and the Russians apologized.

Some crewmen reported seeing Japanese civilians retrieving barrels of food and bundles of clothing which had dropped wide of the compounds and taking the supplies to the camps.

Now, since the POW and show-of-force missions have been completed, the B-29 program in the Marianas has entered a new phase. Training officers have set a minimum of 60 flying hours per month. This includes formation proficiency, transition time for copilots to give them pilot ratings, bringing instrument cards up to date and calibrating all navigational instruments.

All practice bombing missions ceased temporarily after the war ended. Islands in the Marianas which had been used for such missions were being searched by ground parties for Jap soldiers and natives who would be removed to permit resumption of the practice bombing.

The Superforts haven't had too many idle moments since they broke off unfriendly relations with the Japanese empire—70,000 Allied prisioners of war who received candy, soap, vitamin pills, medicine, clothing and food will attest to that. ☆

Death March Medic

BY CAPT. LESLIE CAPLAN

Flight Surgeon

ILLUSTRATED BY SGT. LOUIS S. GLANZMAN

"For you the war is over." The first German officer I ever saw told me that, only a few minutes after I had bailed out of a B-24. We had been on a mission over Vienna with our squadron, the 719th Sq., 449th Bomb Group. We had been hit hard by flak on the way in but managed to make it back to Yugoslavia where we had just bailed out.

But like many of his countrymen, this superman was wrong. For me, the toughest part of the war was just beginning. I was on the verge of a unique medical experience. Less than a half hour after the "war was over for me," I was applying a splint to my copilot's broken leg and my new job had begun.

The next day one of our gunners was brought into the jail where we were imprisoned. He had been bleeding from a nasty scalp wound ever since bailing out. I stopped the hemorrhage. My next patient was the bombardier who was carried in to the jail with a groin injury. Then a friendly guard sneaked me in to see one of our brave allies, a Yugoslav Partisan woman in the next cell. She was dying of erysipelas (contagious) and endangering the other women in her crowded cell. Without medication, I was powerless to help her. Later on the German officer in charge refused to help her on the grounds that she was a Partisan, hence she was not "civilized," and therefore not entitled to medical attention.

It was in this jail that I gave my first lecture—a lecture that I was to repeat dozens of times in the following months. The topic?—It was that close, but treacherous companion of mankind that has devastated armies, that carries a wallop like an atomic bomb, and that during his career has killed millions. It is that dreaded carrier of typhus fever, the *body* louse. (He itches too). This dangerous animal that previously had been something out of a textbook to me soon became a part of our daily life. The routine of picking lice off our clothes became as common as washing our teeth had formerly been.

The Germans soon sent me to Luft Camp IV in Pomerania. This will be remembered as the camp where Allied airmen were bayoneted en masse and bitten by police dogs. There were about 9,000 AAF gunners there and a few hundred RAF enlisted men.

For thousands of captured airmen the 600-mile march from the Eastern Front was an odyssey of disease and death. AAF doctors in this grim cavalcade had little to work with except their courage and medical skill

True, it was a domain of heroes, but from the medical standpoint it was a kingdom of illness. Heroism has its price. First of all, there were those who were wounded, burned, or maimed in aerial combat. Secondly, there were the numerous casualties ranging from irritability to outright insanity. Thirdly, there were the routine illnesses to which any large body of people are subject, including large numbers of skin cases and diphtheria sufferers.

Five Allied doctors were on hand to handle this tremendous sick load. My job was to take care of the 2,400 men of Section "C" —sanitation, sick call, and hospitalization. (As a squadron flight surgeon I took care of only 500 men and had the best hospitals in the world behind me.) The prison hospital, although fairly well supplied at times, was pitifully small. Only the sickest cases were admitted. Others were treated in the barracks area.

Air gunners can do more than shoot. Many of the hospital wardmen were airmen who were trained on the spot. They made good medics. Our buddies in the RAF were good too. These fellows were intelligent, learned fast and worked hard. They worked at Section C Dispensary, where they changed dressings many hours daily, treated minor ailments, and could even spot a case of diphtheria.

Of the many unusual medical incidents occurring at Luft IV, one should go down in history. Doctors often wonder how much of their teachings are absorbed by seemingly indifferent soldiers who register all sorts of gripes about getting shots and try to get out of them. How many soldiers would take their immunizations if it were voluntary?

At the Prison Hospital, we had been accumulating vaccines that the Red Cross sent in. When there were 300 doses of typhus vaccine available for our 2,400 men, notice was posted that at 1,000 hours on Sunday, shots would be given to those who wanted them. There would be no records, no rosters, no Form 81s. If you want the shot, come and get it. If you don't want it, stay away. There are only 300 shots available, first come, first served.

Sunday turned out to be a cold day—10 below zero. I wondered if the men would wait outside so long in such bitter cold just to get the needle. I soon found out.

Hundreds—yes, hundreds of men were waiting in line. There were so many that we decided to give half doses. Shots were given while they lasted—a total of 600—and many had to be refused. It was certainly a triumph for Preventive Medicine.

Early in February, the Germans crowded 3,000 of our men into trains and shipped them out. This included most of our sick and wounded. On February 6, the rest of the camp was marched out on a few hours' notice. I marched with Section C which now numbered 2,600 men. I was worried and wondered if the men knew what was in store for them. We were on the road for 86 days during which we marched, starved, froze, marched, scratched our lice, suffered disease and marched some more. We lived in filth, slept in barns or fields and dodged aerial strafings. We marched from the Eastern Front to the Western Front and then doubled back to the Eastern Front. We covered 600 miles.

For food we averaged 770 calories a day of German rations for the first 53 days of the march. (An American soldier gets 3,500 calories a day.) If it had not been for the Red Cross food parcels we received occasionally many more of us would have died. Those parcels not only gave us an additional 600 calories a day but they were our only appreciable source of proteins. The last 30 days of the march, the Germans issued us more food and Red Cross parcels and were much more humane. They could hear Allied artillery in the distance and knew the day of judgment was nearing.

As a medical experience, the march was nightmarish. Our sanitation approached medieval standards. The inevitable result was disease, suffering and death. We soon found out what it means to live in filth on low rations and little water.

Our first problem was handling the stragglers. Volunteers at the end of the column would spot a fellow who was weakening and support him. When a straggler could not keep up even with help, a medic would stay behind to give him the protection of his Red Cross Arm Band. In that way the straggler was much less likely to be bullied by the guards. Sometimes it didn't work and both medics and stragglers were gun-butted.

The number of stragglers increased daily and it became impossible to support them all. The Germans allowed us to organize a "slow party" which was made up of sick men who were permitted to proceed at their own pace. That helped some. In addition, they gave us a few farm wagons to carry the sick. Uncomfortable and cold as those wagons were, there was a long line of men waiting to get on them every morning. There was room for the sickest only.

In the course of the march, we would pass Allied prison camps which were too crowded to take us in but we were usually able to leave our most serious cases.

At first the stragglers consisted of men with blisters, aching feet or joints, and tired muscles. These men suffered, but they didn't cause us much concern for we expected them to toughen up. The medics made up a slogan: "Keep on marching and your blisters will turn into callouses and your aches into hard muscles." Most of them did, too.

But all too soon the straggling became more serious. Blisters became infected and many an ugly abscess developed and had to be opened. Mud and cold brought frost-bite and in some cases, gangrene and amputation. Men collapsed either from hunger, weakness, fear or pain.

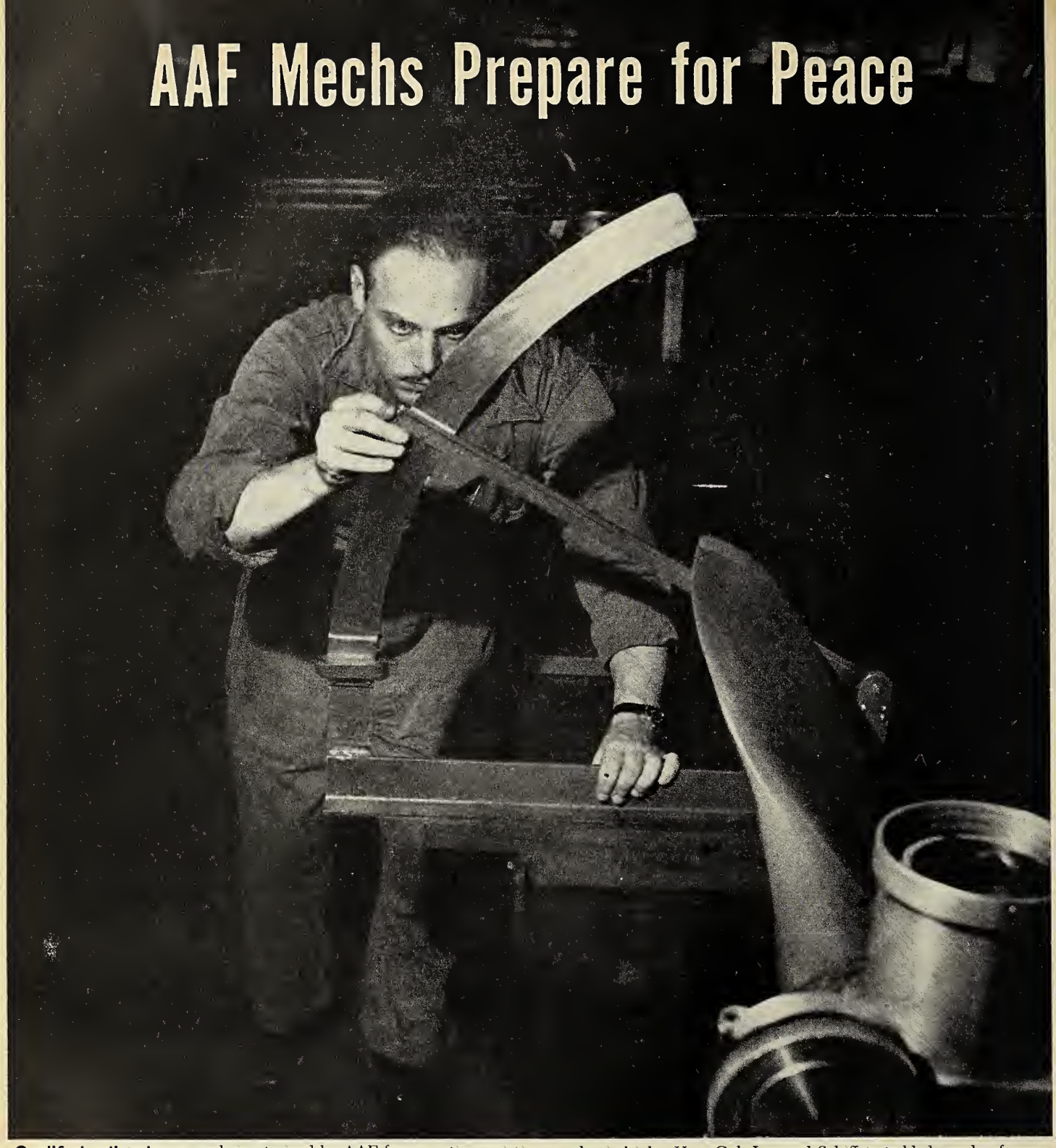
The fifth day of the march, the first case of diphtheria was diagnosed. This soon was followed by a case of erysipelas. Then cases of pneumonia began showing up, and on the latter part of the trip, tuberculosis was in evidence. There were several attacks of acute appendicitis.

But the illness that really plagued us was dysentery—a natural sequence to living in filth and drinking unsafe water. Dysentery just overwhelmed us. It was of varying intensity. Some fellows were just annoyed while others were prostrated. Almost everyone had it. Day after dreary day as we marched along, the roads were lined with our dysenteric comrades relieving themselves. The sad spectacle of a soldier relieving himself right on a village street was so common that it excited no comment from German villagers.

Taking care of all the sick was a heartbreaking job. We started out by organizing a hospital and before long many a former airman was working on our staff. Every night the

(Continued on Page 47)

AAF Mechs Prepare for Peace



Qualified enlisted men are being trained by AAF for peacetime aviation mechanics' jobs. Here Cpl. Leonard Schiff tests blade angle of prop.

PHOTOS BY T/SGT. ROGER COSTER, AIR FORCE STAFF PHOTOGRAPHER

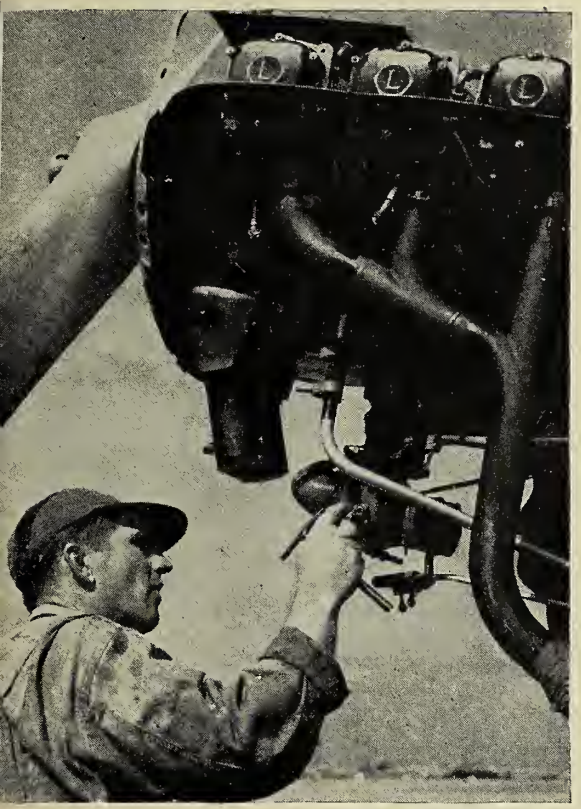
There are many civilian jobs available for AAF-trained aviation mechanics for which applicants must be certified by the Civil Aeronautics Administration before they can qualify. To enable enlisted men to take advantage of such peacetime opportunities, the AAF is conducting a course of instruction for holders of MOS Nos. 747, 750 and 2750 with at least one year of experience, so that eligible personnel may pass the CAA examinations and become certified aircraft and aircraft engine mechanics even before they are discharged.

The course is divided into two sections—Aircraft Engine Mechanic and Aircraft Mechanic. Subjects covered by the first section include carburetion, magnetos, ignition systems, powerplants, lubrication and propellers, while the second part of the course stresses rigging and assembly, wood, fabric, covering and doping, hydraulic systems, sheet metal and welding, plus civil air regulations. Classroom instruction is combined with practical work, and the program employs progress tests and written examinations as well as films, mock-ups and training-aid devices.

Only one hour a day of a man's off-duty time is required for the course, and the period of instruction extends from 60 to 90 days. The program already is available at a number of domestic airbases, and it is expected that air forces overseas installations will soon be participating. ☆

The course lasts from 60 to 90 days and enables a man to pass successfully the required CAA examination. Here Pfc. Thomas A. Needham is running spark plug tests.

Under CAA regulations, a practical knowledge of light planes is essential. Realizing this, M/Sgt. Anthony Cooper studies the generator of liaison-type aircraft during the one hour a day of off-duty time allotted for the course.

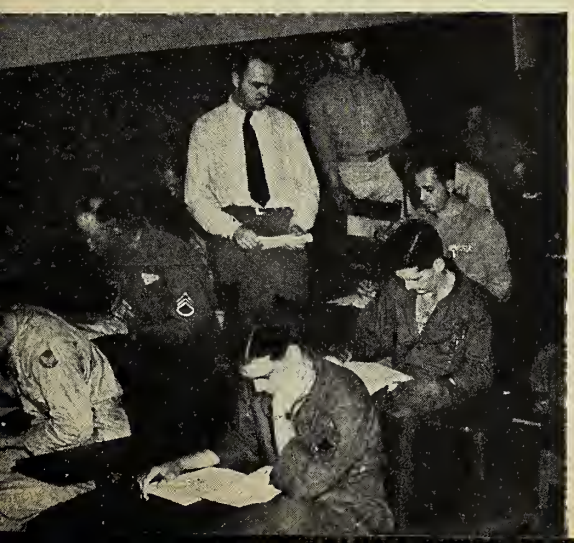


Working on the carburetor of an L-5, Pfc. Dudley Dobbs prepares for the test on light plane engines which must be passed before he can receive a CAA mechanic's rating.

Hoping to return to civilian life as fully qualified aircraft and engine mechanics, S/Sgt. James F. McEnery (left) and Sgt. John Gilmour are repairing a wing at one of the many AAF shops participating in the program.

The refresher course consists of both classroom work and practical instruction. Below, students take written examination to determine their grasp of CAA regulations.

At Bolling Field, a CAA technical adviser gives a class a few pointers on wooden propellers (below). Initiated at the D. C. airbase, the program is being made available at other AAF installations, both domestic and overseas.



"Phosphorus bombs fired the control tent."

SIGNAL SERVICE

BY COL. D. M. HARVEY

Signal Officer, 5th Fighter Command

When signal troops went ashore on Leyte two hours after the first wave of infantry to put aircraft warning on a paying basis, they carried with them a net of experience that stretched more than 2,000 miles from the muck of Port Moresby.

Less than two years before they had landed at Moresby with radar equipment and Aussie ground observers. Here they established what was to become the base for air warning operations in the entire Southwest Pacific area.

The radar had scarcely warmed up in Waigani swamp next to Ward's drome when a worried operations officer got on the phone. The secret weapon was here and he was going to use it—he thought.

"Hey look," said Operations, "we got some G-2 on 10 Betty bombers staging at Lae. Can you pick 'em up?"

The radar officer, Lt. (later captain) Roscoe C. Sparks, looked away from the 10,000-foot Owen Stanley's over which the Bettys might come, and peered down at his map. The enemy base at Lae was over 200 miles away. His scope, on a good day, read out to 58 miles.

It was said later that the old radar equipment operated best with a GI seated on the antenna with a pair of field

Our signal troops came up the hard way from Guinea jungle and Leyte mud to spot the Jap in his own backyard

ILLUSTRATED BY SGT. LOUIS S. GLANZMAN

glasses, and that it read one height—5,000 feet. But it was a start and, under Col. John M. Brewer, the Signal Office of 5th Fighter Command plugged away at setting up a system that would cover Papua, Owen Stanleys and all. Their equipment was heavy and outmoded; they had one green battalion, the old 565th. Climate, terrain and transportation were not on their side.

They made a lot of mistakes, and they heard about them, long and loud. When they found Jap bombers looking down their throats, they realized it wasn't a good thing to track targets since the Nips proceeded to ride down the beam. They used HF voice radio until they learned it was easily monitored and even more easily jammed. Air warning field men came in from the festering jungle and cursed the Signal Office, were cursed out themselves and sent back to the jungle to try again. But with probably the most profane communications system (and the most difficult to maintain) in history, they wrested the element of surprise from the heavily outnumbering enemy air force and beagled fighter planes of the command into position to shoot the Nips down.

In 1943 air warning coverage was nearly 100 percent. In the last great daylight raid on Moresby on April 12, there were two hours' warning and a 160-mile track on the incoming bombers. Thirty-six fighters, of which only four were P-38s, went up from Dobodura, battled the Nips across Kokoda Pass, over Moresby and out into the Coral sea. The Nips lost 48 of 100 planes and got the idea that things were getting rough.

In 1944, Leyte's shell-scarred beachhead set the pattern —and it was a rough one—for Fighter Command's air warning operations throughout the campaign. The men knew that the Guinea Air Warning System which had occupied most of their time for the past two years was only a proving ground. That was backyard stuff. Leyte was the Jap's front door.

For three weeks prior to the Leyte landing on October 20, the Signal Office went all out on the job. With the Army field order as a basis, they worked from maps, aerial photos, reliefs and past experience to lay down the campaign plan. Placing radars on the spot is at best a tricky business; working from maps doesn't make it any easier.

A few things were as obvious as they were standard; get air warning, assault early-warning radar on the beach on the heels of the infantry; get GCI coverage to the first captured strip—that was Tacloban; get a control point on the beach, and quick; get the fighter control center in operation to take over from the Navy.

We knew shipping would be first priority. Leyte lay at the head of a gulf that could be attacked from three sides. Island and shore sites on Samar, Homonhon, Dinigat and Leyte's lower tip were "must" items. Priority Number 2 went all the way back to Moresby. A ridge of mountains ran down Leyte's middle, not as high as the Owen Stanleys, but just as tough for coverage. With the Japs' Ormoc base on the other side, the ridge was vital. We figured we would have to ask the infantry for Baybay, 35 miles south of Ormoc.

Long before Leyte, the Fighter Command signal organization had been divided into wings and its original two battalions broken up, augmented and redesignated. Each wing had two battalions, with two skeleton battalions in reserve. The Central Pacific contributed another—Hawaiian trained. Two old companies were picked up—"A" of the 565th, which had set up the first completely American fighter sector at Buna, and "C" of the 583rd, veteran of the Hollandia beachhead. For the fighter control squadron we selected the 49th, organized from the famous 49th Group, and itself a veteran of Buna. Because we had long since learned that maps and terrain very often disagree, that the neatest plans get smeared up in beachhead mud, we formed a Wing Detachment—"H". It was a miniature staff carrying complete authority to adapt the set-up to the tactical situation. It was commanded by Lt. Col. Edgar A. Boadway, who had four Guinea landings under his belt.

By October 10 all units were loaded and moving to Hollandia to join the largest convoy the Pacific had ever seen. Four days later ground observers left by submarine to join the Rangers in taking Dinigat Island in Leyte gulf and to make contact with Filipino guerrillas.

The Leyte landing, except for its size and the soupiness of its mud, was much like any other. The beach was hot in spots, but five hours after the assault began all air warning personnel were ashore and gathering up their equipment. The first night was full of rain and shelling and infiltration and boiling with curses at the mud.

Control and filter personnel, the least encumbered, had the best luck. They moved into the ack-ack control post, set up their radios and started picking up the local air warning net on which the Navy was putting out, contacting guerrilla and ground observer stations and generally getting the feel of the situation.

Radar units had tougher going. The 13th platoon of "C" of the 583rd, scheduled to set up their early-warning equipment at Tacloban, found themselves landed at Palo, eight muddy miles to the south. On beachheads mixups are no novelty. While the infantry was securing Tacloban strip on D-plus-one, the platoon pushed, hauled, carried and bulldozed the unit to Tacloban. They dried it out that night and next day were in operation, racing with the 16th platoon at Palo to get on the air.

Fighter Control Center was itching to set up shop in its semi-permanent position just off Tacloban strip. But a battery of Long Toms had squatter's rights and control center didn't feel like arguing. On D-plus-three the center dug in. It had two lightweight sets and a mobile warning set from the 574th operating, had liaison with the AAA and the Ground Task Force; guerrilla intelligence and ground ob-

server reports were beginning to filter in with the Navy filling in the gaps in air warning coverage. The primary net was in and control center felt capable of taking over control and protecting the beachhead. That was a damned good thing, for the Navy soon was occupied with the Jap task force which precipitated the Battle of Leyte Gulf.

The naval battle looked rough, but it could take care of itself. Meanwhile, the air warning system came in for two lucky breaks. The infantry made a lightning drive across the mountains to grab Baybay; an early warning outfit of the Central Pacific's XXIV Corps chased in behind it. A double landing on the north coast of Leyte and Samar gave the 14th platoon of the 583rd a chance to set up their radar and plug the gap to the north.

The first week had been rugged—infiltration, shelling, bombing, strafing, rain and mud. But by D-plus-10 the air warning system had most of its lightweight radar and two GCI sets operating, plus early warning coverage to the west from Baybay. By D-plus-seven the strips were opened, and the P-38s of 5th Fighter Command's 49th Group came in to the GI cheers that echoed from Tacloban to Dulag.

By D-plus-10 Colonel Boadway and his staff felt that they deserved a night off before sweating their heavy units into position. That night the first typhoon hit. It wiped out the radio shack and message center tent and thoroughly snarled up AW communications. The men at control center cursed and started putting the wreckage together again.

Ordinarily, air warning moves back to a secondary position after the enemy's initial reaction to the landing. By D-plus-10 it was still a question whether the enemy would stick around and fight. Then the first Jap raider came through on the night of November 3 and laid a string of HE bombs 200 yards from the fighter control center. That was the blowoff. Enemy planes made run after run. Ack-ack drummed out the night. At 0200 phosphorus bombs fired the control tent; half the personnel beat out the flames while the rest continued to plot incoming planes.

The control center operated behind blackout curtains until the powerplant was hit; then the men worked with flashlights. The operation was continuous and a stream of enemy plots and friendly night fighters flowed steadily across the board. When the shift was relieved at 0600 the men had a pretty good idea that the Nip was going to put up a fight for Leyte. They knew it when the first convoy, spotted by ground observers and guerrillas, ran into Ormoc. All ships were knocked out, but plenty of Jap troops got ashore to strengthen the Japs on Leyte.

It was the sucking, oozing mud that gave air warning its major role. The mud slowed divisions to a creep and made bogs out of airstrips. It was no place for heavies or mediums. It was a job for the fighters. They had to fly cover, beat off enemy strikes on friendly shipping, prevent enemy convoys from reaching Ormoc and squeeze in air support missions for the infantry. There were never more than 90 planes operational, so it was up to air warning to present the information which would allow the most efficient disposition of the aircraft.

From D-plus-20 until D-plus-50, there was no enemy raid that was not detected and tracked. There was no convoy that was not reported by ground observers. There was no surprise raid on any installation. During those 30 days, ack-ack and fighters shot down 467 enemy aircraft. Five convoys were destroyed with help from Morotai-based mediums and Navy planes.

Things stayed too hot for control center to move out of its make-shift set up at Tacloban. But up at Burauen, our Fighter Command moved in near Bomcom; Air Force and Signal Section set up their own operation board. On the big board, behind blackout curtains, Brig. Gen. Paul B. Wurtsmith and his operations officer, Col. Robert Morrissey, sweated out the disposition of their fighters and set up missions. Completely cut off for a week by a coordinated enemy paratroop and ground attack (see "Banzai in Burauen," AIR FORCE, March 1945) they were still able to keep their fingers on the pulse of the air war.

Meanwhile, the AW system heaved its heavies into place and started to experiment, coming up with some neat new wrinkles. On the ridge behind Fighter Command, Lt. Eddie Worrad of 49th Fighter Control set up a visual control post—an installation consisting of a lap board, a radio to monitor fighter control center and a sergeant to split the shift and keep the coffee boiling.

Out of 12 contacts, Worrad counted nine kills.

It was the first step toward a completely mobile fighter control center which could travel with Army headquarters.

December 7 brought the payoff of the Leyte campaign. General MacArthur had come to the bold decision of taking his 77th Division out of central Leyte and shipping it around the island for a frontal attack on Ormoc. But the Japs had plans too. Guerrilla nets began to buzz with news of a Jap convoy moving down from Manila. The fighters, primed for an escort mission, would have to split —part for defense, part for attack.

In the fighter control center that morning officers and GIs watched, and kept their fingers crossed, as the target stands moved across the gridded board with agonizing slowness. The Yank convoy moved on; so did the Nip. The Yank cover circled carefully; so did the Nip. Enemy targets started to line up out in the Camotes Sea. P-38s and P-47s and naval aircraft rendezvoused over Tacloban and roared west. The target stands began to converge. Air-ground monitors started to crackle. The target stands converged in the center of Ormoc Bay. It was Fourth of July with bells on.

Late in the afternoon reports began to trickle in: all 13 ships of the Jap convoy sunk; 81 Jap aircraft shot down against our loss of five; a completely unopposed landing by the 77th. The back of the Jap defense was broken.

A week later our troops were in Mindoro. Six weeks later they were rolling down the highway from Lingayen to Manila. With Corps headquarters went a unit which had developed out of Worrad's visual control post on the bluff at Burauen—a mobile fighter control center working in a motorized van.

When the battle for Leyte was over we finally got around to summing up the job air warning had done. This is what our check sheet showed: The units had started giving warning on D-plus-two; they had covered a high percentage of all raids for the entire campaign and bombing casualties had been remarkably light; in spite of changes growing out of the tactical situation, the final coverage looked very much like the original plan.

The end of the Leyte campaign was the end of another phase of air warning. All emphasis had been on the control of interceptors, detecting the enemy and vectoring the fighters to the most advantageous position. But as the Jap air force dwindled in striking power, air defense and air warning assumed less and less importance.

On Luzon enemy raids quickly fell off to nothing, and we began working more and more on direct air-ground coordination. There, for the first time, we put out visual controllers, known as air support parties, who used radio-equipped jeeps within visual range of the target to direct low-flying aircraft against stubborn Jap ground positions.

With experience in the Philippines and sweat in New Guinea behind us and with our equipment getting better and better by the day, we were confident of success in our final mission that was scratched by the Japanese surrender. ☆

Tempelhof Turnover

Tempelhof eagle's swastika yields to American emblem.

By an Air Force Overseas Staff Correspondent

The target we tried not to hit in Berlin, because we wanted it for postwar use, was big, egg-shaped Tempelhof airdrome. It is now Hq Berlin Air Command, home base for various AAF units with personnel totaling 2,500.

"When we moved in last summer," explains Col. William G. Booth of the 9th Air Force, CO of Tempelhof, "the place was a shambles. We bulldozed a clear space for landings and take-offs and went on a full schedule the first day. But getting the place policed up is terrific. The big handicap is size—we're a respectably large outfit but we feel like a midget walking around in Primo Carnera's clothes."

The 20-odd bombs that had fallen in the landing area were overs and shorts from RAF and 8th and 9th Air Force bombers. The mess that Colonel Booth had waded into was caused by ordnance of Russian ground forces who had to spend two days dislodging the Germans.

The immense ovoid landing area has been entirely cleared, and the ATC and TCC components at the airdrome are doing a heavy business these days, making Berlin once again a big air center. At present the daily average is 70 plane movements, virtually all C-47s of ATC or TCC, and activity is increasing. The Troop Carrier unit in Berlin functions like the ATC; it specializes in transporting leave personnel to places such as Nice and Cannes.

Long before it hummed with air traffic, Tempelhof (original home site of the Knights Templar) was a parade ground where the Kaisers reviewed their stiff-legged troops. The first Tempelhof event of especial interest to the AAF occurred in 1909, when Orville Wright made several prophetic flights there in a curious contraption then called a flying machine. A few German fighter planes were based there in 1918. Commercial planes began operating at Tempelhof in 1925. An easy target, it was little used by the Luftwaffe in World War II.

What makes Tempelhof the world's greatest air terminal are the buildings, not the landing-field space, which has a long diameter of 7,000 feet, running NW-SE, and a short diameter of 5,200 feet, going at right angles. These dimensions and the installation's 1,333 acres are exceeded by the B-29 bases and by many commercial fields. But no airport in the world can match the vast, Pentagon-like buildings that edge the field and, at one side, form colonnades and quadrants around a 1,000-foot entrance plaza.

The field itself was laid out minus runways. Some of the AAF pilots who have come in on its turf have said they liked a surface that absorbed so much of the landing shock. Others complained about the sward's fouling up the undercarriage on muddy days. Those who prefer a hard apron are pleased with the recently superimposed runway of pierced-steel planking that runs due east and west for 5,000 feet. But pilots have something else to beef about in landing at Tempelhof because the horizon is spiked with church steeples, high buildings, water towers, flag poles and chimneys, while the long diameter of the field is in direct line with the highest point of the main hangar.

This hangar itself is a pretentious affair which, like the rest of the airdrome's architecture, could have been dreamt up only by a Pharaoh, a Roman emperor, or a Nazi. The hangar is 70 feet high, 170 feet long, and three-quarters of a mile wide. Its semi-circular roof is supported by girders cantilevered out from massive Krag steel columns. The passenger-loading platform took up 1,246 feet; here planes taxied in under the roof, loaded, taxied out. The Nazis planned to have a sightseers' gallery on the roof, where 30,000 entranced spectators at a time were to watch the fabulous aerial traffic of the victorious Hitler's postwar Berlin. Rumor has it that three thrones were to be built in the middle of the gallery where Hitler, Goering and Goebbels were to have sat on state occasions and bowed to the happy throngs of worshippers. Russian gunfire made the roof of the hangar into a sieve during the Battle of Tempelhof, and in rehabilitation plans the Ripleyesque project of the grandstand has the lowest possible priority. ☆

Overall aerial view of Tempelhof airdrome, showing terminal buildings, landing area and central hangar that is three-quarters of a mile wide.

Battling the Occupation

ILLUSTRATED BY SGT. LOUIS S. GLANZMAN

BY CAPT. AARON HOTCHNER
AIR FORCE Overseas *Staff*

Five thousand GIs and French civilians recently jammed the streets in front of the Palais de Glace in Paris, trying to get in to see the finals of the AAF boxing championships for the ETO. Inside the stadium, a capacity crowd literally jammed the rafters watching eight pairs of AAF sluggers throw leather back and forth in a series of bouts that had more class than the Golden Gloves finals. This fistic event, the first major service boxing tournament held on the Continent since World War I, marked the start of an ambitious sports program designed to keep AAF personnel busy while sweating out the big trip home.

Now that our squadrons in Europe are settling down at more or less "permanent" bases, demands for football equipment, horseshoes, academic classes, ping pong balls, jive bands, cowboy movies, GI funnies and comely dancing partners are flooding special services and education offices from Berlin to Biarritz. Recreation officers face the prodigious job of making life interesting for the thousands of men required to operate USAFE's network of bases.

The sports program now underway will go far toward filling in some of the dull gaps in GI life on the Continent. Tournament and league competition, which was going full blast in the AAF long before the war ended, is now being correlated with similar leagues being set up by the Ground Forces and other components. A good indication of the size and popularity that these inter-league contests are likely to attain can be found in the All-Theater swimming and track championships held in Nuremberg's huge stadium in the summer. It seemed fitting that the first "GI Olympics" be held in bomb-blasted Nuremberg, once the scene of some of Hitler's most lavish master race demonstrations. The thousands of soldiers who crowded the low stands around the ultra-modern, ten-lane pool, were rewarded with an exciting contest in which the 7th Army barely nosed out USAFE.

The track and field meet, held a week later at Nuremberg Stadium (renamed "Soldier's Field") was the climax of the GI Olympics. Probably the most colorful athletic carnival since the 1936 Olympics, this meet, won by a powerful 3rd Army team, gave real indication of the size and spirit of future championship events. Nurembergers say that the Nazi planned to use this stadium, which was the Hitler Youth headquarters during the huge Nazi party gatherings, as the place where Allied units would be paraded and made to eat dirt in humility before their Nazi captors. The Allied parade so far—in addition to the swim and track events—has included archery, horseshoes, baseball, softball and football. A tennis championship was played at historic Wimbledon in England; the golf title was decided at Saint-Cloud, near Paris. Wacs have been busily running off championships of their own in various part of the Continent.

Although the final events of these championship contests allow only a few athletes to participate, thousands of teams train and compete at the start of the tournament. For example, every station under USAFE's command is notified months in advance that an AAF Championship Basketball Tournament will be held on a particular date. The various squadrons of each station then decide whether they wish to participate and a league is formed at each station. At the end of the season the winner of the station league is sent to compete in a play-off tourney conducted by the wing. This winning team, in turn, takes part in the command contest which determines the finalists for the USAFE play-offs. The USAFE champion then vies for ETO honors against the top teams of the other organizations in the theater.

Although league and tournament contests inevitably are more widely publicized, the men who are planning the AAF program are placing the chief emphasis on mass athletics, sports for all. And instead of trying to get the men interested in calisthenics which, no matter how disguised, is still push-ups and deep-knee bends and something that the average GI likes a little less than night KP, the AAF policy is to get a large variety of athletic equipment

Blues

Whether it's a course at Oxford or a boxing match in Paris, the AAF provides plenty of opportunity to combat boredom among ETO peacetime forces

to the squadrons and permit the men to engage in whatever sports they desire. Special services reports show that squadrons are continually running off tournaments in horseshoes, ping-pong, softball, pool, touch-football, darts, volley-ball and a wide variety of other sports. Probably the most popular tournament game is darts, which undoubtedly is a carry-over from the pre-invasion pub days.

To aid and abet its sports program, USAFE's Special Services Section is running a clinic for coaches and referees. The clinic's faculty is comprised of well-known college coaches and officials who are flown over to the theater on special assignment.

For the air force man who is not particularly keen about athletics, the Army provides extensive educational opportunities, ranging from a two-week course in animal husbandry given at his airbase, to a nine-week course in political economy at Oxford University. Col. C. R. Frederick, who heads USAFE's educational program, comments: "Any man over here who wants to go to school can pretty well write his own ticket, no matter what subject attracts his interest."

The most accessible classrooms are in unit schools which function at each air force station. The curriculum of these schools is determined by the men themselves on the basis of an educational survey. For example, if there are 10 or 12 men at an air depot group who decide that they would like to study business law, a class is set up for them. This class then meets for three or four weeks, two hours each day. There are no entrance pre-requisites in these unit schools, anybody can attend and ask for any course that is given. A glance through the current bulletin of the station Headquarters 9th Air Force Unit School reveals such courses as "America in Literature," "Modern News Reporting," "20th Century Bookkeeping and Accounting" and "Automechanics Course I, the Engine."

Although the unit school functions for the largest number of students, the means of learning in the ETO are the two American University Centers at Shrivenham, England, and Biarritz, France. Several hundred professors from outstanding universities in the United States were brought to England and France to make up the faculties. At these colleges the student has no KP, guard duty or other military chores. Needless to say, enrollment is always at a maximum.

Don't get the idea, however, that the courses at Biarritz and Shrivenham are snaps. If anything, they are a little more difficult than the average college course in the States. The universities operate on a three-hour, five-day week schedule and a student is required to put in one hour of outside study every day for each course he takes. Only enforcement of this rule, however, is the student's conscience; a GI is not expelled for low grades—that is, unless it looks as if he's goofing off. Ninety percent of the enrollees are enlisted men, 10 percent officers.

The American Technical Training School at Warton, England, is concerned with bringing men who had had previous training or experience up-to-date on the advances in technical fields such as plumbing and heating, architectural drafting, teletype installation and maintenance, refrigeration, radio service and numerous other crafts. Students who pass satisfactorily are given certificates which should be useful in obtaining jobs.

To augment Warton's technical training opportunities, an on-the-job program has been set up for men who want to learn a specific trade but cannot meet the pre-requisites for entering Warton. These on-the-job classrooms are spread throughout Europe; a swank gambling casino in Southern France now contains a laboratory for X-ray instruction; a warehouse in Germany that contained bolts of Nazi cloth is now the classroom for a course in spray painting; a former bakery in Luxembourg has been outfitted with machines and is an on-the-job classroom for studying the use of engine lathes.

Last July, the Sorbonne opened its doors to American part-time students and the first class was composed of 800 officers and enlisted men who took a 60-day course in French language and civilization. By now, other schools in England, Belgium and France have many GI enrollees. These include Oxford, Kings College, Nottingham University College, University of Brussels, University of Paris and other famous seats of learning.

Numerous specialized courses are offered by private businesses and civil administrative offices. A seven-week course at the Cours de Syndicat de Couture Parisien gives the lowdown on Paris styles in dressmaking. Visits to famous fashion salons, talks by well-known designers and a fling at designing and making garments keep the students busy. Most of the students are Waes and nurses.

(Continued on Page 47)

Model

Miniature Japan used for films had crane, left, synchronized to bring camera over "terrain" at comparative speed and altitude of B-29.

The topography of Japan became an involuntary movie star during the later phases of the war, when the AAF Moving Picture Unit at Culver City made miniature replicas of enemy terrain for use in B-29 briefing films.

Two sound stages were devoted to this project. Every available bit of information on future 20th Air Force targets was used to make these reproductions accurate. They were uncannily life-like, as the pictures on these two pages show. Textures of paperboard, plaster, dirt, sand and fabric materials, painted, became cities and mountains, aircraft works and harbor installations. Airfoam from mattresses simulated forests; piano wire served for railroad tracks.

Counterfeiting the targets themselves was only part of the job. The Superfort crews needed more than this in the briefing films; they had to be shown exact routes to targets, complete with landmarks, check points, initial points and points of bomb release. Besides this, B-29 radar

Basic contours of Japanese land forms were cut from composition board and then stapled together as preliminary step. Later, plaster and other substances were added before the entire fabric was painted.

Corner of "Japan" gets a little sand in its facial make-up as AAF Motion Picture Unit technicians prepare it for the shooting of a strip in a briefing film for Superfortress crews due for missions over Japan.

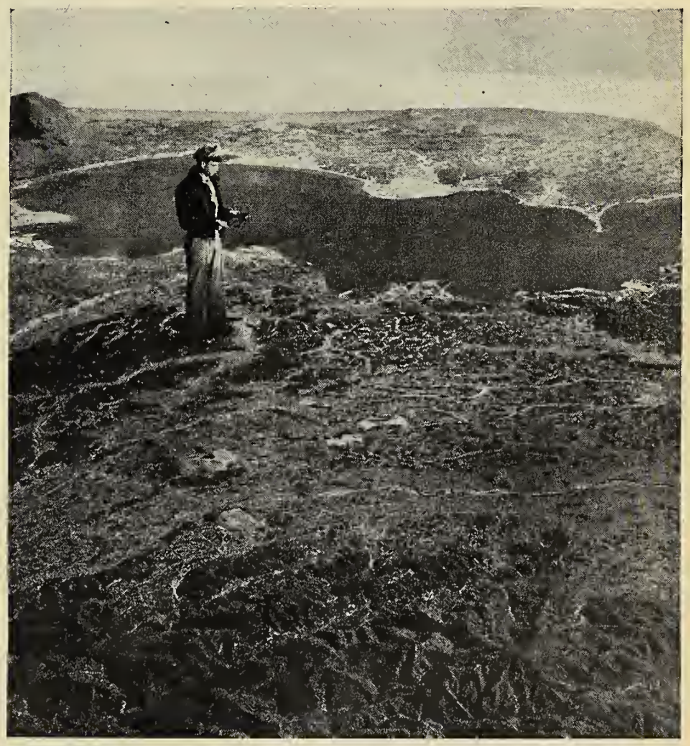
Target

Realistic copy of Yokusa naval base for briefing film even has sunlight on sea. Ripples were made by spraying plaster on composition.

operators needed movie sequences that would show them in advance what would appear in their mickies while bombing through an overcast.

The Culver City unit produced footage for bomb runs on each important industrial installation that the Superforts were smashing toward the end of the war. At least 20 prints of every picture were rushed to Saipan by special officer courier, and by the time the crews saw the actual targets they knew them cold. ☆

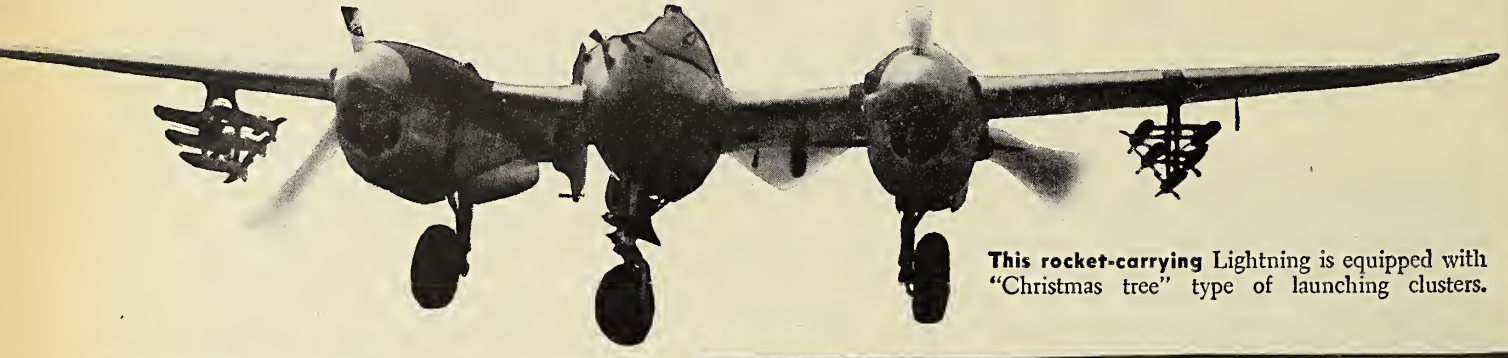
Reconnaissance photo is used to guarantee accuracy as the miniature replica of an industrial target at the mouth of the Edo River in Tokyo Bay gets final touches. Ocean has been sprayed and painted.



Comparative size of a hunk of "Japan" is shown by Capt. William F. Ryan, who is doing the Gulliver here. Captain Ryan, a radar-navigator, supervised radar phases of the photography for film unit.

LETHAL SKY ROCKETS

BY SGT. PETER BAUMANN
AIR FORCE Staff



This rocket-carrying Lightning is equipped with "Christmas tree" type of launching clusters.

Early in the war it became apparent that something was needed to bridge the gap in aerial armament between the machine gun and light cannon on the one side and the bomb on the other. Guns were suitable for strafing attacks against personnel and light material, while bombs could be used only against large targets. The field was wide open, therefore, for an accurate intermediate weapon of great destructive power to be used against such pin-point objectives as tanks, fortifications, small warehouses, bridges, supply dumps and multitudes of other enemy installations.

The 75-mm cannon was proposed for this purpose, but tests conducted by the AAF Proving Ground Command at Eglin Field, Fla., showed that it was heavy and slow-firing, and could not be adapted to more than a few types of aircraft. Aerial rockets, on the other hand, could be thrown forward at high speed without reaction on the plane, without having to sustain the dead weight of a cumbersome gun, and without reducing the number of machine guns, the bomb load or the external fuel tanks carried. Rockets were comparatively light and could be slung under the wings of fighter craft with only a negligible loss in mph, while launching devices could be jettisoned if necessary. Through the use of an intervalometer they could be fired singly or in salvo, and accuracy could be developed to such a high point of dependability that by launching several rockets at a time a pilot could practically insure a direct hit on a target as difficult as a moving locomotive.

Ripple of 10 five-inch High Velocity Aircraft Rockets goes some 1,800 feet per

As compared to a cannon, rockets offer greater mobility and a more concentrated volume of fire under certain circumstances, and can be used at daisy-top levels. Moreover, the installation of a heavy caliber gun in a plane is limited by the ability of the airplane structure to withstand the recoil. The force to be absorbed from a 40-mm cannon firing a three-pound shell, for example, is in the neighborhood of 6,000 pounds. The plane must therefore be stressed to "take it," and the caliber of the gun is necessarily limited by the point where it becomes impracticable to strengthen the airframe any further. In rocket operations, this factor presents no problem, since the recoil is taken up by the high velocity gases ejected by the rocket itself, which blow beneath the wing surfaces and do not affect the plane's attitude of flight, permitting the craft to fly steadily on its course during the firing of successive rounds.

The advantages of rockets over bombs, for special purposes, are equally impressive. Rockets launched from fast-flying planes are driven by the thrust of a mighty charge of propellant powder, while bombs fall to the target merely under the pull of gravity. In consequence, the impact of a rocket may be as much as four times that of an ordinary bomb, with a terrific penetrating and blast effect, spreading deadly fragments and hot metallic ashes over a wide area. Then, too, under conditions of low attack, detonation will occur well ahead of the plane, whereas in similar circumstances a bomb would burst almost directly beneath it.

Basically, the rocket is a self-propelled missile composed of three principal parts: 1, the head, sometimes called the body, which may contain HE, smoke, shrapnel or incendiary chemicals; 2, the motor, a tube extending to the nozzles in the rear and housing the propellant material, and 3, the fins, which help stabilize it in flight. When the propellant in the motor, usually a solid powder, is ignited, it generates flaming gases which exert pressure in all directions inside the tube, but which are allowed to escape through the rear at a high rate of discharge. This produces a reaction against the warhead in the opposite direction,

In the closing stages of the war, rocket missiles proved themselves to be one of our most effective aerial weapons

P-47's eight machine guns are augmented by 10 five-inch HVARs seen under wings.

second on release from P-47, can blast through armor as well as reinforced concrete.

and the rocket is propelled forward, continuing to accelerate as long as the propellant charge burns. The fin assembly comes into play after launching and serves to stabilize the rocket on its true course so that it follows a predetermined path to the target.

The AAF's active interest in rocket development dates back to June, 1942, when the Material Center at Wright Field was charged with the responsibility of adapting rockets for aireraft use. Although no rockets had been solely designed for planes in the United States, Army Ordnance had had considerable success with a fin-stabilized rocket manufactured for the ground forces, and this was immediately modified for aerial purposes. The Ordnance rocket was a 4.5-inch diameter projeetile, designated M-8, three feet long and weighing approximately 40 pounds. Fired from the air it had an effective range of from 800 to 1,000 yards, and was launched from a tube 10 feet long, obtaining its stability by means of folding fins attached to the rear of the motor which opened as the rocket emerged from the tube. As installed under the wings of aircraft, three of these tubes were mounted in either an M-10, M-14 or M-15 cluster, with firing being accomplished by individual electrical circuits. Although the tubes were made of light plastic and could be dropped after use, initial trials in various theaters showed that their additional drag caused a loss of performance detrimental to tactical employment, and it soon became obvious that better rockets and superior methods of launching would have to be designed before the missiles could take their place as standard weapons in operational aircraft.

After various other rocket models were experimented with, the California Institute of Technology, working with the Navy under contract to the Office of Scientific Research and Development, initiated a vigorous program in the spring of 1943 to perfect forward firing rockets for aircraft. Research was accomplished in a relatively short time on a series of projectiles and launching methods, and three principal rockets were evolved. These were the 3.50-inch aircraft rocket (AR), the 5.0-inch aircraft rocket (AR) and the 5.0-inch high velocity aircraft rocket (HVAR)—all fin-stabilized and suited for a variety of different targets.

The 3.50-inch AR consisted of a motor 3.25 inches in diameter attached to a 20-pound solid steel head, resulting in an overall length of 65 inches. Its weight was 54 pounds, maximum velocity 1,175 feet per second in addition to that of the plane, and effective range approximately 1,000 yards. The primary use of this weapon was the destruction of submarines, for the solid steel head could easily penetrate the hull of a sub after substantial underwater travel, causing great damage.

The 5.0-inch AR was composed of a high explosive warhead 5 inches in diameter attached to the motor of the 3.50-inch AR, thus increasing its total weight to 80 pounds while maintaining approximately the same overall length. Although the larger head slowed down the rocket to a velocity of about 850 feet per second, the explosive charge in the warhead provided a greater punch against targets where penetrating effect was not of primary importance.

It was from this latter rocket that the now famous 5.0-inch HVAR was finally produced, utilizing the warhead of the 5.0-inch AR attached to a 5-inch diameter motor. Total weight was increased to 140 pounds, including eight pounds of HE in the warhead, and length was standardized at six feet. Blazing along with an accurate range of 1,000 yards, the rocket was capable of penetrating armor and reinforced concrete. To add to its versatility, the armor-

piercing plug on its head could be replaced with a nose fuze set for instantaneous explosion on impact.

To launch these rockets, a zero-rail was devised, consisting of two streamlined posts, or studs, one at the forward end of the rocket and the other at its rear, which held the projectile at a point some six inches below the surface of the wing, parallel with the datum line of the plane.

A launcher establishes the initial direction of a rocket's flight by constraining the motion of its center of gravity until it leaves the launcher. Proper aiming will locate the center of impact of a group of rounds on the target, but the accuracy with which the individual rockets follow this aim depends considerably on the construction of the launcher. In some prior installations, notably those of the British, long guide rails were used to give the rockets initial accuracy, but as experience was gained in rocketeering it was found that a fixed fin rocket tended to align itself with the airstream in the same manner as the common weather vane, and that it was possible to obtain comparable accuracy on fast planes from minimum-length launchers. The term "zero-rail," then, refers to the absence of guide-rails of any kind and is used to describe a device that fulfills all the requirements for launching, yet actually guides the rocket for only about an inch of relative motion.

The devastating effect of rocket weapons (the 5.0-inch HVAR has roughly the explosive power of a 155-mm shell) has made the AAF fully aware of its potentialities, and every effort has been made to exploit new developments to the full. To this end, an experimental station was established at the Dover Del. Army Air Field, under the jurisdiction of the ATSC, during the summer of 1944, and a training center for rocketeers was set up at Foster Field.

As a result of cooperative work by the AAF Army Ordnance, Navy and NDRC, new installations were designed, rockets were tested, methods of launching were devised and the effectiveness of rockets against various targets was evaluated. The AAF station at Dover was manned by approximately 200 rocket experts and technicians under the direction of Col. Donald B. Diehl.

In the Normandy breakthrough the AAF made the first combat use of the five-inch HVAR. Numerous attacks were made by a rocket-equipped P-47 group on targets in the St. Lo area of France and spectacular results were obtained. In rapid succession, reports of the destruction of locomotives, tanks, airfields, gun positions, warehouses, bridges and rail yards, came back from the front, and as more and more rockets reached the forward lines, the havoc that could be wrought by this new scourge from the sky became increasingly apparent. On July 17, a dozen Thunderbolts made a rocket attack against a rail yard at Tiger-Quail, silencing a flak tower with a direct hit on the first run and destroying 25 locomotives, three repair shops and a roundhouse on subsequent swoops. On the following day, 12 more aircraft struck the airfield at Coulomiers, launching 37 rockets. One large and four small hangers were hit and an ME-110 and a fuel dump were destroyed. Two staff cars were also struck, the rocket passing through one of them and exploding in the other. In a two-month period, one unit of the 9th Air Force made 323 sorties and fired 1,117 rockets for which 371 targets were claimed as destroyed and 105 listed as damaged.

In the Pacific the success story was more or less similar, with aircraft rockets being relied on extensively for attacks against Jap installations. The 10th Air Force in Burma, for example, installed rockets under the wings of B-25s, scoring 55 hits out of 99 rockets fired on 9 missions against supply dumps, rolling stock and buildings.

The objectives against which rockets have been found to be effective are so numerous and varied that it may be safely said that anything which could be put under artillery fire, if it were within artillery range, could be considered a good rocket target.

The type of plane that is best adapted for the firing of rockets is one that has good maneuverability at high speed. Thus, fighters make the best rocket carriers, with dive bombers second and torpedo planes third. The degree of accuracy obtained with the weapon depends upon the altitude of the plane, dispersion of the rocket after launching and aiming error of the pilot. Inaccuracies, however, decrease as the speed of the plane is increased, so that at 250 mph a trained pilot can put half of his rockets within a 16-foot circle from a range of 400 yards.

In addition to the work on the 5" HVAR, the AAF conducted research on other rockets, and in cooperation with NDRC Allegheny Ballistics Laboratory, Cumberland, Md., a 115 mm rocket was developed which weighed 36 pounds less than the HVAR, yet had comparable accuracy and target performance at ranges up to 1,000 yards. The lightness of the 115 mm rocket made it possible to be launched by the "tier" method, in which two of these projectiles were carried by each post, one beneath the other, in order to double the effective rocket power of the individual plane.

To eliminate the drag caused by empty post launchers on the flight homeward, a retractable launcher was devised which disappeared into the wing after its rockets had been fired, and which enabled a rocket load to be jettisoned in an emergency. Also, as a logical step in the direction of total streamlining, experiments were conducted at Dover in the drop-launching of 115 mm and 5" HVAR rockets from the bomb bays of attack aircraft, with an ignition delay before firing sufficient to allow clearance beneath the fuselage—a method previously developed with another rocket by NDRC Caltech group and the Navy.

Even earlier the desirability of an internally carried launcher was apparent. A six-round automatic launcher for 4½", M-8 and spinner rockets was fabricated by the United Shoe Machinery Corporation, which showed considerable promise in its operating principles. The device used a series of paper-plastic carrier tubes in a vertical magazine, with an electric drive indexing the tubes successively downward to the bottom of the magazine and into alignment with a launching barrel and exhaust tube, at which point it was fired. The empty carrier tube was then jettisoned.

Following ground tests and air firing, a B-25H equipped with this internally carried launcher was flown to the Burma-India theater and combat-tested by pilots of the 10th Air Force against Japanese targets in northern Burma. The automatic launcher fired its six rockets at the rate of two per second, or at the rate of 120 rounds per minute, as compared to the 10 or 12 rounds per minute of the 75 mm cannon, and served as the forerunner of improved models which were reloadable in flight and which could carry 16 or more rounds. From the success which a new, revolver-type launcher made by the Bell Laboratories under an NDRC contract received during tests at Dover in May, 1945, it may be assumed that the day may not be far distant when all rockets launched from aircraft will be carried within the sleek shape of the fuselage.

At the war's end, the AAF's program for rockets showed that many innovations were being planned. Rotational stabilization, in which several offset nozzles would produce a rotational as well as a forward thrust, was on its way to becoming an actuality, cancelling out the effects of any eccentricity in the rocket, reducing dispersion and eliminating the bulky and fragile fins which have made rockets hard to handle and store. ☆

News and Views around the World

CROSS COUNTRY

Contact on the Double

Not to be lost in the general shuffle of individual stories concerning the landings of the 11th Airborne Division on Atsugi airdrome in the days immediately preceding the formal Japanese surrender ceremonies in Tokyo Bay is the account of the 68th Army Airways Communications System group which paved the way.

This was the group's biggest show. It had been carefully rehearsed on Okinawa days before and when the actual performance began, nobody missed a cue. The advance echelon of the group hit the runway of the airdrome outside Tokyo at 0845 on August 28. From one of its C-47s rolled a completely equipped jeep-mounted control tower. It was on the runway and ready to handle air traffic before the last plane in the initial flight of 11 touched the ground. In less than 45 minutes, radio transmitting equipment installed in the Army's first flying radio station was in contact with Okinawa, giving other planes en route Japan full information about weather and field conditions.

Within a few hours after the first Jap surrender report, Gen. George C. Kenney called Col. Gordon A. Blake, CO of the 7th AACS Wing, into his headquarters and outlined the communications requirements for the first phase of the occupation:

"We will need a flying AACS station which must land and get into operation before the second wave of planes (C-47s with insufficient range for round trip) reaches the point of no-return. After you have landed you will radio the all-clear back to Okinawa. Or in the event that you encounter treachery, you must intercept planes already in flight before they proceed too far. Your second requirement will be to provide navigational guidance for all our planes into Atsugi by setting up homing beacons and a four-course radio range. Finally you will be required to direct traffic on and off the fields."

Colonel Blake picked up his phone and outlined the plan to Col. Reeder G. Nichols, CO of the 68th group. "Can you do it, and if so when will you be ready to leave?"

"Give us 48 hours and we'll be set to go," replied Colonel Nichols. "But we'll need 24 or 25 C-47s at Neilson Field right away."

Within a half hour the planes were on their way from Clark to Neilson Field and Crash Project Number One was under way in a matter of minutes.

The next 48 hours are not likely to be forgotten by anybody in the 68th AACS. They were tackling a new problem and one involving a complete change in communications plans which, up until Hirohito's offer to accept the Potsdam terms, had assumed large-scale amphibious landings on Japan. Nor would it be enough merely to fly the *equipment* to Atsugi and then build the stations after that. This job meant that, for the first time, the planes themselves had to become self-contained high-powered operating and receiving stations.

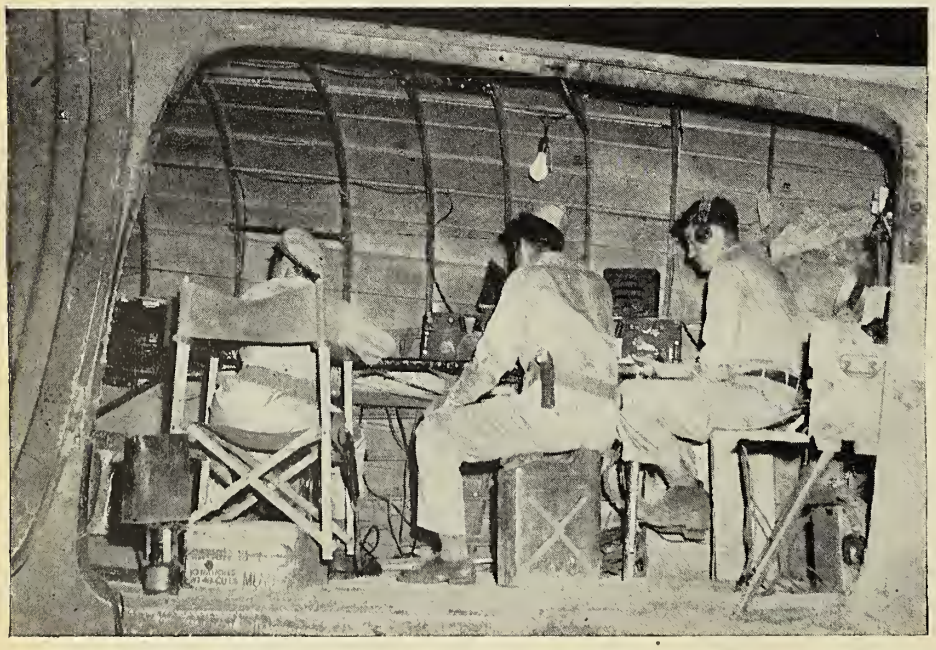
Colonel Nichols and his staff, including Maj. Robert Green, deputy, and Maj. Glen Montgomery, engineering officer, began the fastest design job of their careers. Using scale models of transmitters, receivers, Diesel engine generators and other radio equipment, they planned specific installations for each of the radio-station planes. Meanwhile, Capt. David Hockman, personnel officer, dispatched planes to Leyte, Biak and New Guinea to round up AACS personnel. Maj. Paul Annable's supply men gathered transmitters, operating consoles and maintenance equipment, uncrated it, tested it and rushed it to the installation crews.

Nobody chalked up any sack time during the next two days and nights, but on the morning of August 13, just 42 hours after Colonel Blake's call, the AACS flying radio stations left Neilson runway on a test flight to Clark Field. Here they landed, plugged in wires, cranked up power units and were "on the air" in 41 minutes. Later, at Okinawa operating and maintenance crews ran off several dress rehearsals of the show while waiting for diplomatic and military protocol to be worked out for the formal surrender.

The flight into Atsugi on the 28th was led by Colonel Blake himself. As Major Blake he had climbed into Hickam Field's control tower on December 7, 1941, and directed those few AAF planes lucky enough to get airborne. Now, almost four years and 46 invasions later, in a control tower on the Jap mainland itself, he personally supervised the landings of the first American occupation forces.

As the radio planes landed on the Atsugi strip, they taxied to pre-arranged parking spaces. Four aircraft which contained the power units and transmitters set up shop in the middle of a Jap plane graveyard at the southeast corner of the runway. A fifth plane containing five operating consoles for positions to Okinawa, Manila, and for air-ground communication was parked nearby, while the receiver plane was pulled into place next to the operations building. Other planes carried complete VHF transmitters-receivers with RTTY equipment for duplex operation plus voice circuit, a medium-powered 4-course radio range, VHF traffic control jeep-mounted SCR 522s—and 140 men, additional equipment, weapons, fuel and rations for five days.

Within minutes after the portable "towers" were in operation, the AACS men began to set up the equipment for the permanent control tower which was to be constructed on the roof of the operations



On the air at Atsugi: flying AACS station—rolling control tower

building. By 1900 on the 29th, these communication men, most of them veterans of D-days from Moresby to Davao, had completed the job and when the C-54s started to bring in the airborne division at 0600 the following morning, AACS was ready for them. Airdrome control was so smooth that huge transports were landing, being directed down taxiways, discharging troops and becoming airborne again in 20 minutes. And with one taxiway and half a landing strip, which is all that Atsugi boasted at that time, that's plenty fast.

Bettering Our Inner Man

Fresh produce has been substituted for critical canned items in all AAF continental commands, resulting in millions of cans of food available for civilian use or shipment overseas, the Air Quartermaster revealed recently.

Central meat cutting and fat rendering plants now are operating at a large majority of AAF stations, bringing about a better utilization of meat and extensive savings. In addition, the various commands have set up traveling teams, or have individual trained technicians available, as specialists in meat cutting, pastry baking and cooking. Several such teams have been sent overseas to assist installations in effecting greater efficiency and economy.

Gardens at AAF posts have contributed food savings, although some installations have been unable to make full use of gardens due to manpower shortages. The Air Quartermaster has called attention to a farm of the 1st Air Force at Westover Field, Mass. It was started two years ago with an investment of $1,200. Today it has 700 hogs, 1,800 chickens, 700 apple trees and an extensive truck garden.

The elimination of waste has brought about remarkable savings. The work of the 1st Air Force again was cited as an example of how waste elimination can mean millions of dollars in savings. In June, 1943, the wastage of edible food per day per man was 13 ounces. By June, 1945, the wastage had been reduced to five ounces per day per man. In conjunction with its food conservation program, the AAF has not sacrificed appetizing meals for its men. Emphasis continues on attractive presentation of food and slow cookery methods.

Bookmobiles in ETO

More books, magazines and phonograph records for forces still in the European theater will be provided by headquarters of the Theater Service Forces. A number of 2½-ton trucks have been converted into bookmobiles to carry an adequate supply of reading material to troops in small and isolated detachments not otherwise served by organized libraries.

Each bookmobile will be allocated to the operating command with an initial book stock of approximately 3,500 cloth-bound books, 10 sets of council books, 10 unit sets of magazines and 50 sets of V-disc phonograph records. Council books, magazines, phonograph records and 2,500 cloth-

QUESTIONS

on Policy and Procedure

Q. May an enlisted man obtain credit for battle participation (bronze service stars) on the strength of his affidavit as outlined in AAF Letter 35-240?

A. Yes. *If an enlisted man claims additional bronze service stars other than those that may be entered on the record, an affidavit for the record containing the organizations of assignment, including dates, together with the geographical area in which the service was performed, will be furnished the decorations and awards officer. On the basis of this information, the decorations and awards officer will determine the additional stars to which an individual may be entitled by tracing assignments and service on a map of the combat zones in question and checking dates of assignment with the limiting dates of the pertinent campaigns. The same procedure will be followed by officers claiming additional credit, except that a certificate instead of an affidavit will be furnished.*

Q. May point credit be obtained for awards when the General Order number announcing the award, command designation and date of the order are not noted on the appropriate records?

A. *Yes, on the basis of certificates furnished by officers and affidavits furnished by enlisted men. However, the medal itself cannot be obtained nor will the appropriate ribbon be worn until such time as official notification is received from the theater commander or unless the General Order number, announcing the award, command designation and date of order are furnished for notification on the record. When point credit for combat awards is given by virtue of an affidavit or certificate, such a notation will be entered on the individual's record, using the statement made as the authority for the point credit and making this certificate or affidavit a part of the official record.*

Q. How will officers who are on terminal leave be paid?

A. *Payments of officers on terminal leave will be made only by the designated disbursing officer of the post, camp or station at which the officer received orders placing him on terminal leave. This action is required in order to prevent duplicate payments which may result because of the previous presentation at the last actual duty station of pay and allowance vouchers covering periods of terminal leave (Sec. IV, Finance Bulletin No. 53, Hq., ASF, 7 July 1945).*

Q. May credit for battle participation obtained under the provisions of Par. 2, AAF Letter 35-240, 23 May 1945, be used for the Adjusted Service Rating Score?

A. *Yes, providing additional credit has been determined by the decorations and awards officer.*

Q. *Is a flying officer entitled to flying pay while on terminal leave?*

A. *No. An order requiring an officer to participate regularly and frequently in aerial flights, if not sooner terminated, ceases to apply on the day prior to the day in which the officer enters a terminal leave status, since the granting of leaves in such cases contemplates no return to duty and has the effect of terminating his assignment to flight duty (C 5 AR 35-1480, 15 August 1945).*

Q. What is the status of a flying officer while on temporary duty for recuperation, rehabilitation and recovery?

A. *The office of the Fiscal Director advises that an officer who is ordered to temporary duty for the purpose of recuperation is in duty status, as distinguished from leave status, and accordingly may perform flights and receive pay.*

Q. May enlisted personnel who have received a court-martial sentence of forfeiture of pay be discharged from the service if otherwise qualified?

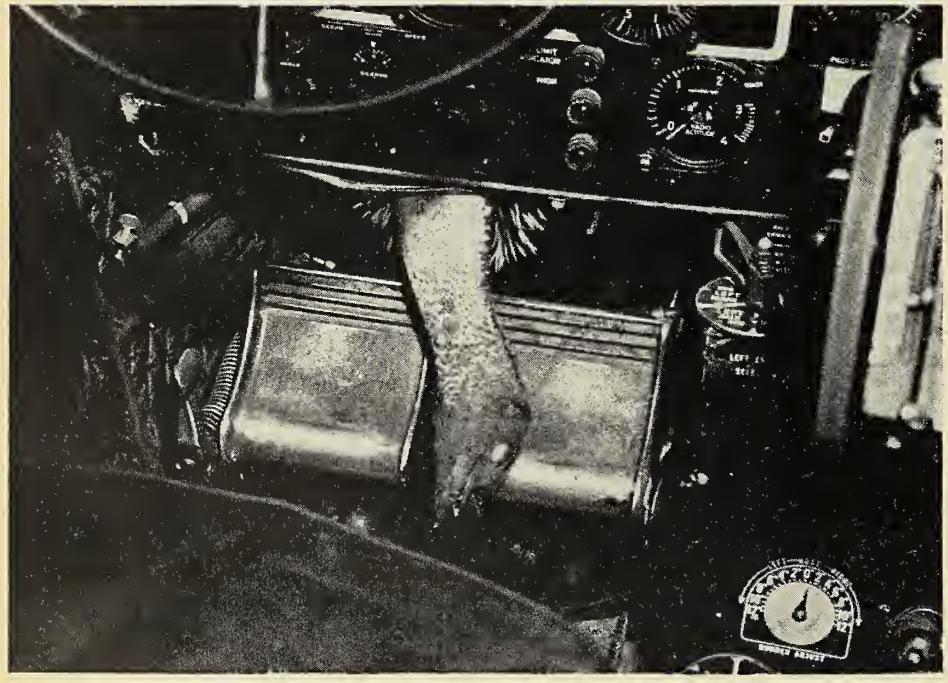
A. *Yes. Par. 10g, AR 35-2460, states: "Discharge operates to remit such portion of a sentence, involving forfeiture of pay, as extends beyond date of discharge, including any unexecuted part of the forfeiture."*

Q. May unit funds be used to purchase theater tickets for the members of a unit or detachment?

A. *Yes, providing each member of the unit or detachment receives one ticket or the same number of tickets and that all individuals are treated alike. The chairman of the board of directors of the Army Central Welfare Fund has concurred in this interpretation.*

PREPARED BY THE OFFICE OF THE AIR INSPECTOR

Vulture dents C-47, finds himself—



—up to his neck in airplane

bound books will be placed on the bookmobile before dispatch to the commands. The remaining 1,000 books will be taken from two Reference and Recreational Book Libraries (R. B. Libraries) either previously alloted or to be alloted to the command. Additional books and records should be requisitioned through regular Special Services channels.

Army civilian librarians will be assigned to commands on the basis of one librarian to each bookmobile. Enlisted personnel, including drivers, to assist the Army civilian librarian in the operation of the bookmobile will be assigned by the operating command.

Bookmobiles will be allocated only to those major commands establishing a demonstrated need for mobile library service. Requests for bookmobiles, giving number required and basis for request, will be addressed to Headquarters, Theater Service Forces, European Theater, for the attention of the Chief of Special Services. Upon approval of requests, commands will be informed concerning suitable personnel to be sent on temporary duty to Paris, France, for the purpose of signing for and obtaining vehicles.

Buzzard Kamikazes

The vultures of India still carry on their undeclared war against aircraft of ATC's India-China Division. One accompanying picture shows the wings and body of a vulture outside a Douglas C-47A, after a midair collision at 7,000 feet near Calcutta. The second picture reveals how the dive-bombing bird went through the plane's metal skin, his neck and head ending between the legs of the pilot, and reaching almost to the control pedals.

What the astonished pilot said will forever be lost in the limbo of tall tales of the orient, since the crew, ferrying the plane to India, had started back to the United States before anyone at the base knew of the freak accident.

Many times before, planes of the India-China Division have collided with the big birds in the air, both over India and over the Hump while enroute to China. One copilot was killed when a vulture crashed through the windshield of his plane during a training flight, and a Liberator Express was completely wrecked when one of the birds hit the outside of the plane, just over the propeller-feathering switches, and feathered all four props at the same time. Fortunately, in this accident, the crew escaped unharmed.

Jap Underground

Just as Britain and Germany sought safety from bombing raids by going underground, Japan also resorted to a mole-like existence in a system of subterranean tunnels. One of the most extensive of these lay beneath Atsugi Airfield where initial occupation landings were made on Honshu. More than 100 entrances were found leading down to engine overhaul, propeller, instrument, electrical, hydraulic repair and machine shops, classrooms, messhalls, offices, barracks and storage rooms for aircraft parts and accessories.

Maj. Robert V. Guelich, of the AIR FORCE overseas staff, who went into Japan with the first occupation forces, has supplied the accompanying description of sample conditions he found in these underground arsenals.

Small gauge railways, electric lights, telephones, running water and air vents made living comfortable for those underground. The need for this protection from bomb and strafing attacks was found at the Atsugi Naval Airdrome which was neutralized as one of the largest land service centers in Japan. Burned out hangars and shops, wrecked airplanes and scattered engines were found by the occupation forces, yet 50 to 100 feet underground, repair and overhaul work and one airplane assembly line continued until the end of the war on a scale that would have supported several squadrons of planes indefinitely. In one system alone were found facilities for bunking and feeding 3,000 men. Other tunnels had stocks of tools and fuselage sections. Another tunnel had hospital facilities. Another was used for extensive oil storage.

Japan's war-making potential was going underground on a grand scale when the war ended. An air force assembly plant

five miles from Oya was just beginning operations and its engine component had already turned out 10 engines. Fifty engines had been produced in each of the subterranean plants at Asakawwr and Mochiniune. Many newly dug parts factories were almost completed in Kanto Plain in the Nagoya area, Akashi, Toyakma and Kanazawk. Another new assembly plant was being built near Hachioji.

Although the Japanese made much of these facilities in their home front propaganda, a conservative estimate by a Japanese air general was that full production could not have been expected before the summer of 1946.

Our Honorary 'Freemen'

Infrequently in the past, English cities have bestowed the title of "honorary freemen" on such persons as Theodore Roosevelt, Florence Nightingale, William Pitt and General Eisenhower as a mark of signal distinction.

In a day-long celebration at Cambridge after VE-day, the 300,000 men and women who have served with the United Kingdom-based 8th Air Force were awarded the title of "honorary freemen" by the famed university city.

The occasion marked the first time in history that such a large group, British or otherwise, had been so honored.

On behalf of the personnel in the command, Maj. Gen. William E. Kepner, commanding general of the 8th, accepted from Mayor George Wilding an oak case containing the parchment scroll which bestowed the honor "in recognition and grateful appreciation of the great part played by that unit in winning victory for the cause of liberty and justice in the European War . . . . and in memory of the close and happy association with Cambridge of the whole unit."

The General reciprocated by presenting the city with a scroll of appreciation. A bomb panel from "Swamp Angel," the last 8th Air Force bomber to drop its explosive load on Europe in this war, is being sent to Cambridge as a war trophy for permanent display.

An Old Score

Shot down by an AAF fighter pilot far behind Jap lines, Admiral Isoroku Yamamoto, commander in chief of the Imperial Japanese Navy, met death as he had lived his life—with punctuality. The U. S. War Department recently announced the dramatic circumstances surrounding the end of Yamamoto, famous for his boast that he would dictate peace terms from the White House.

It was the admiral's known determination to be punctual at all times that led to the formulation of plans for the successful interception of his flying inspection party. Yamamoto's plane was shot down on the morning of April 18, 1943, by Lt. Col. Thomas G. Lanphier, Jr., 29, at the exact spot where U. S. Naval Intelligence had estimated his plane would be in accordance with a secretly obtained schedule of

PLANE BONERS

Analyzed by Veteran Pilots

MARIANAS—During a flight from a forward to a rear base, the pilot of a B-29 landed at a field 70 miles from his destination because he thought he was low on fuel in one tank and was unable to transfer. The fuel transfer pump had been taken out of the airplane at the forward area for installation in a B-29 scheduled for a combat mission. The plane was refueled at the intermediate base and the pilot experienced no difficulty until he was over his home field and turning on the base leg with gear down and half flaps down. Then, No. 3 engine cut out followed almost immediately by No. 4. No attempt was made to feather these engines. Knowing he was low on gas, the pilot straightened the airplane in a futile attempt to make the engines catch again and then turned back to the field with full flaps down. As the airplane settled too fast to make the field, the pilot cut the throttles and crashed straight ahead.

Comment: *It's just as important to have enough fuel, with reserve, for a 100-mile flight as for 1,000 miles.*

GREENVILLE, TEXAS—On a fighter instrument mission, the pilot of a P-47 was to make a 3,000-foot take-off run but after covering 3,000 feet of runway his indicated airspeed was only 95-100 mph. Applying full throttle, the pilot continued down the 5,000-foot runway, and neared the end of the strip with airspeed of 115 mph. He pulled plane off ground, and after he retracted wheels the airspeed increased to 120 mph. The pilot then applied turbo to get more power, increasing the airspeed to 125 mph, but the plane started to drop off and the pilot belly-landed it one mile off the end of the runway.

Comment: *Chalk this one up for the mechanics who did an overhaul job on the hydraulic system and re-installed the valve tank regulator, part No. 89F3840L, backwards. The plugs were badly fouled and hydraulic fluid was found in the carburetor air duct.*

KANSAS CITY, KAN.—Four attempts were made to start an A-26 left engine before it finally caught. The airplane was then taxied out for take-off run and engines run-up. On take-off two-thirds of runway was used and left engine trailed black smoke, appearing to cut in and out. Sufficient altitude wasn't gained and the right prop nicked the top of a building adjacent to the field. Pilot feathered prop and the left engine carried him on out. The A-26 was flown on a right pattern around the field and the pilot came in for a landing. Gear was extended on the downwind leg, and when the plane was ready to come down, at 100 feet, the pilot tried to skid it in line with the runway. The plane stalled and crashed.

Comment: *The pilot had exhausted the precious commodities—airspeed and altitude. He was killed and the A-26 reduced to rubble.*

LEMOORE, CALIF.—A P-38H was being ferried to Ontario (Calif.) Army Air Field. Just as the plane became airborne, the pilot heard an explosion on left side. Manifold pressure jumped to well past 4 inches, back to 0, and then settled at 30 inches. The pilot landed aircraft and as he turned off the runway he became aware that the left engine was on fire. Emergency trucks extinguished the fire.

Comment: *Examination disclosed that left engine had burst its impeller, and further investigation revealed a rag had been caught under a clamp at the hose connection in the carburetor air intake duct at the point where it joins the intercooler section. Air passing through the duct had carried the rag to the carburetor screen. The subsequent shutting off of air caused backfire. A carburetor change had been made several days prior to the accident, and the cloth had been used to fill openings to prevent accumulation of dust and foreign material. It had not been removed.*

SANTA MARIA, CALIF.—In landing a P-38L hit the ground right wheel first while skidding to the right as a result of the pilot's failure to correct properly for a left crosswind. Resultant stress on right main landing gear assembly caused it to collapse. Airplane skidded to a stop on right prop, right wing and right boom.

Comment: *Tricycle gear minimizes ground loop danger but undue stress imposed on landing gear when landing in a skid or slip is still dangerous. Corrections for drift should be just as precise as when landing conventional types.*

PREPARED BY THE OFFICE OF FLYING SAFETY

NEW BOOKS

WAR

OUT OF CARNAGE. *A. R. Griffin.* An account of America's efforts in medicine and science to save human lives in battle. HOWELL, SOSKIN, N. Y., 1945.

OUR FIGHTING SHIPS. *M. D. Katz* and others. Pictures and descriptions of our Navy today, from battleship to motor torpedo boat. HARPER, N. Y., 1945, rev. ed.

HISTORICAL

SELECTED SPEECHES AND STATEMENTS OF GENERAL OF THE ARMY GEORGE C. MARSHALL, CHIEF OF STAFF, UNITED STATES ARMY. *G. C. Marshall.* 48 speeches delivered between October 1, 1938, and June 15, 1945. INFANTRY JOURNAL, WASHINGTON, 1945.

POSTWAR

HOW YOU CAN GET A JOB. *G. L. Gardiner.* Questions and answers for the prospective job-seeker. HARPER, N. Y., 1945.

GOVERNMENT JOBS AND HOW TO GET THEM. *S. D. Spero.* Information about 500 different kinds of work in government service. LIPPINCOTT, PHILADELPHIA, 1945.

500 POSTWAR JOBS FOR MEN. *Vocational Guidance Research.* A dictionary of occupation with information on how to choose and obtain them. DOUBLEDAY DORAN, GARDEN CITY, N. Y., 1945.

TECHNICAL

WINGS AND THE WEATHER. *A. L. Chapman* and others. A study guide in meteorology for student pilots. PITMAN, N. Y., 1945.

THE COMING AGE OF ROCKET POWER. *G. E. Pendray.* The evolution of the rocket principle from its discovery to modern wartime developments. HARPER, N. Y., 1945.

PLASTICS IN PRACTICE. *John Sasso* and *M. A. Brown.* Properties of plastics and fabricating methods as used commercially. MC GRAW-HILL, N. Y., 1945.

THE FUNDAMENTALS OF RADIO AND HOW THEY ARE APPLIED. *H. L. Williams.* An outline of radio theory and practice. BLAKISTON, PHILADELPHIA, 1945.

YEARBOOKS AND HANDBOOKS

THE MODEL PLANE ANNUAL, 1945. *D. C. Cooke.* A new edition of this book on the building of model airplanes. MC BRIDE, N. Y., 1945.

These books are available to AAF personnel through the AAF Field Technical Library Service, which provides for technical libraries at all major installations. For a complete list of books so available, see TECHNICAL PUBLICATIONS FOR ARMY AIR FORCES TECHNICAL LIBRARIES, Book List No. 2, March 1945 and supplements thereto. These lists are compiled by AAF Headquarters Library. Personal copies of these books may be obtained from the publishers or retail bookstores.

the admiral's flight plan.

Acting on information relayed to commands in the Southwest Pacific by the late Secretary of the Navy Frank Knox, Colonel Lanphier and a group of AAF flyers in P-38's departed from Guadalcanal for their rendezvous with Yamamoto.

Riding one of his newest bombers at more than 200 miles an hour, the Admiral was accompanied by virtually his entire high command in similar aircraft. When identified by Colonel Lanphier's flight, the Admiral was right on the dot. The rendezvous had been accomplished within bare seconds of the predicted time.

Admiral Yamamoto was officially announced by the Japs as "killed in combat with the enemy." Colonel Lanphier was awarded the Navy Cross for the success of his mission.

Reason for the delay in announcing the details of Yamamoto's death came with the disclosure that Colonel Lanphier's brother, 1st Lt. Charles W. C. Lanphier, 27, a Marine Corps fighter pilot, had been a prisoner of the Japs at the time, and it was felt that any information concerning the identity of Yamamoto's destroyer might result in death of Lieutenant Lanphier at the hands of his captors.

The Dawn of Peace

I left my friend at the little cemetery in the Missouri village where he had spent his childhood. I folded the United States flag and handed it to his mother, then I hurried away.

He and I were the same age, 22, both flyers.

I had seen many men meet death in the skies over Europe, but it was always more distant, and less tangible than this. Then it was clean—flak, fire, flying parts, then nothing but the steady drone of your own engines.

Bringing his body home and facing the people who had created him was an ordeal I shall never forget. The funeral had been typical of all the sad, torturing grief that can be created out of sympathy and kindness on the part of relatives and friends in a small community.

Last night was officially the end of the war. It was the night before the funeral, and I walked down the little dirt road toward the main section of the town. The people were celebrating. They had a bonfire going and kids were throwing their straw hats into the flames. As I came to an intersection I saw a group of young girls, arms locked, walking along singing "God Bless America." I stood there, outside the bright light of the bonfire, filled with my own thoughts and reflections of a world once again at peace.

Suddenly a car drew up and a couple of fellows hauled a dummy out of the back seat and tossed it into the flames. I watched the effigy of Hirohito kindle and burn, and it brought back to me the reason I was in this little Missouri town.

About 5:30 on the morning of August 10, someone had run into the barracks and said the Japs were asking for peace. All of us had jumped out of bed and rushed for the radio. That was the last time I saw him—while we crowded around the radio in our underwear.

A half an hour later he buzzed the barracks.

He and I were the only flyers on the small emergency field, and he had gone down to the hangar and rolled out the plane. He did some snap rolls over the field at about 500 feet. He did one to the right, over the center of the field—and he didn't come out. The plane stalled. He struck the ground before he could recover. The plane was burned to ash before the firemen had soaked enough water around the body to lift him out.

I didn't tell his family how he took his life. I talked about the beautiful sunrises we have in the desert. I described the ever-changing purple mountains, and the serene beauty of the morning he went down.

The details, I left out. But they are here for you.—Capt. James C. Ray, commanding officer, Blythe (Calif.) Army Airfield.

Direct Wire

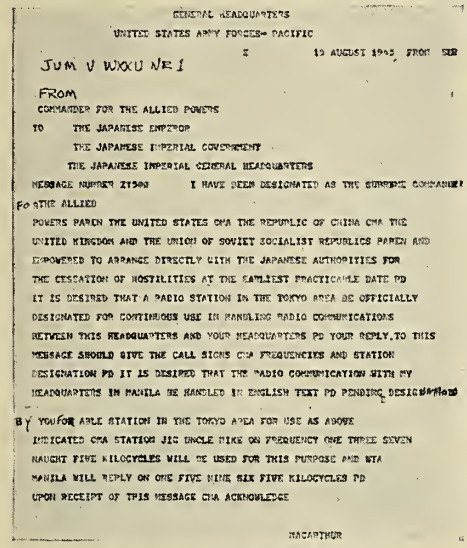
When General MacArthur wanted to send his first direct message to Emperor Hirohito following Japan's surrender, a

AIR FORCE MAGAZINE

CAPT. WM. T. LENT *"Geez! Youse boids is lucky, your fightin' days is tru!"*

problem arose as to the means of communication. If the message went through diplomatic channels at Berne, two days might be required for the transmission. The General preferred to send his message direct.

Maj. Gen. Spencer Akin, chief signal officer on General MacArthur's staff, asked Army Airways Communications System if



GENERAL HEADQUARTERS
UNITED STATES ARMY FORCES- PACIFIC

15 AUGUST 1945 FROM SIB

JUM V WXXU NR 1

FROM
COMMANDER FOR THE ALLIED POWERS
TO THE JAPANESE EMPEROR
THE JAPANESE IMPERIAL GOVERNMENT
THE JAPANESE IMPERIAL GENERAL HEADQUARTERS

MESSAGE NUMBER Z1500 I HAVE BEEN DESIGNATED AS THE SUPREME COMMANDER FOR THE ALLIED
POWERS FAREN THE UNITED STATES CHA THE REPUBLIC OF CHINA CHA THE
UNITED KINGDOM AND THE UNION OF SOVIET SOCIALIST REPUBLICS FAREN AND
EMPOWERED TO ARRANGE DIRECTLY WITH THE JAPANESE AUTHORITIES FOR
THE CESSATION OF HOSTILITIES AT THE EARLIEST PRACTICABLE DATE PD
IT IS DESIRED THAT A RADIO STATION IN THE TOKYO AREA BE OFFICIALLY
DESIGNATED FOR CONTINUOUS USE IN HANDLING RADIO COMMUNICATIONS
BETWEEN THIS HEADQUARTERS AND YOUR HEADQUARTERS PD YOUR REPLY TO THIS
MESSAGE SHOULD GIVE THE CALL SIGNS CHA FREQUENCIES AND STATION
DESIGNATION PD IT IS DESIRED THAT THE RADIO COMMUNICATION WITH MY
HEADQUARTERS IN MANILA BE HANDLED IN ENGLISH TEXT PD PENDING DESIGNATION

BY YOU FOR ABLE STATION IN THE TOKYO AREA FOR USE AS ABOVE
INDICATED CHA STATION JIG UNCLE MIKE ON FREQUENCY ONE THREE SEVEN
NAUGHT FIVE KILOCYCLES WILL BE USED FOR THIS PURPOSE AND WYA
MANILA WILL REPLY ON ONE FIVE NINE SIX FIVE KILOCYCLES PD
UPON RECEIPT OF THIS MESSAGE CHA ACKNOWLEDGE

MACARTHUR

MacArthur to the Emperor

it had a high-powered transmitter which could reach Japan.

"If the message is ready," replied Col. R. C. Nichols, commanding officer of the 68th AACS Group, "put it on GHQ teletype to WXXU and we'll send it out from there."

WXXU is the AAF Weather station which re-broadcasts to the entire Southwest Pacific area weather information received from other AACS stations all over the Pacific. In the months before V-J this station had rather contemptuously been sending its weather information in the clear on the assumption that eliminating the necessity of elaborate coding and decoding more than outweighed any possible use the Japs were in position to make of weather data. It was a well known fact that the Japs had been copying this free weather map of the Pacific every day. And this fact made it a sure bet that the Japs would pick up General MacArthur's message to the Emperor in the same fashion.

The message directed that the Japanese allocate one of their radio frequencies for direct communication with Allied Supreme Headquarters. Specifically he suggested that Jap station JUM, which had been heard clearly in Manila, would be satisfactory.

Signalling Jap call-signs—stations which had deliberately jammed our own frequencies in the past—the AACS station put the message on the air and repeated it at intervals of two hours. Then it sat by to monitor JUM. Soon the Jap reply was received on the frequency that General MacArthur had requested, and direct two-way communication was established between the two headquarters.

New Films Available

The following AAF training and special films have been completed and initial distribution has been made. Short-term loan prints may be obtained from area Air Technical Service Command control film libraries: TF 1-3460, "Aerial Navigation—Map Reading"; TF 1-3467, "P-47 Combat Operations"; TF 1-3468, "The Gun Camera Program for Flexible Gunnery Training"; TF 1-3469, "Fixed Gunnery Pursuit Curve Firing—Part I"; TF 1-3471, "Preparation and Loading for Air Evacuation"; TF 1-3473, "B-24's Get Back"; TF 1-3746, "B-29—Idle Adjustment of the Ceco Carburetor"; TF 1-3753, "Gasoline Injection System—R-3350 Engine"; TF 1-3754, "B-29—Ground Control"; TF 1-3766, "Hack Saw Blades and How to Use Them"; TF 1-3774, "Radar Weather"; SFP 151, "Wings for This Man"; SFP 174, "China Crisis"; SFP 175, "Air Siege"; SFP 187, "Victory in the Air" and SFP 191, "The Fragmentation Bomb".

The following AAF films have been completed and initial distribution to libraries will be made in the near future: TF 1-3459, "The SCS-51 Instrument Approach System"; TF 1-3472, "Gunnery in the B-29—Introduction to the B-29"; TF 1-3473, "Gunnery in the B-29—Operational Checks"; TF 1-3476, "GSAP Errors"; TF 1-3477, "Airborne Radar Gunnery"; TF 1-3481, "AN/APQ-23 — Radar Navigation and Bombing Procedures"; TF 1-3483, "Safety in Air Maintenance Depots"; TF 1-3748, "B-29—Determining Weight and Balance"; TF 1-3752, "B-29—Electrical Sources"; TF 1-3768, "Double Wasp Water Injection System" and SFP 205, "Para Demo Bombing, Fifth Air Force."

Wilbie's Woes

The end of the war meant nothing to Pvt. Wilbie Hoitz. He is still backsliding his mistaken way as a bulletin board example of what not to do on the ground for the AAF — or yourself. Wilbie is the cartoon handy man of the Ground Safety Division, AC/AS, 1, and his antics have been plastered on AAF walls from the Pentagon Building to Chungking.

Wilbie was introduced, poster fashion, in February of this year as a part of the Ground Safety Division's program, and his exemplary warnings have contributed in no small way to the lowering of the AAF's ground accident rate. The character is a mental creation of Maj. Campbell Bradt, and he was put to work under the pen of William G. Day, commercial artist, who has been in civilian service for the AAF since January, 1942.

Shepherds of Southernknowe

In the rugged hill country separating England and Scotland, Col. Eugene A. Romig, representing the 8th Air Force, and Sir James Ross, of the British Air Ministry, recently honored the shepherds of Southernknowe for their part in rescuing British and American airmen who had crashed in the mountains of Cheviot during the war. These shepherds, only inhabitants of the lonely Cheviot area, are credited with saving many lives of airmen who crashed or were forced down in bad weather.

On one occasion in December, 1944, Shepherds John Dagg and Frank Moscrop, went out in a blinding snowstorm and in almost impossible conditions to rescue four or six Americans whose B-17 had crashed. For this act the shepherds were presented with an 8th Air Force scroll and the British Empire Medal. Dagg's collie dog, Shelia, who found one of the injured airmen more than 150 yards from the wreckage, was presented with the Dickin Medal to become the first civilian dog to receive this award.

PARACHUTES

LOST

42-112494E	42-431291A	42-704972D
42-187934D	42-561023C	42-707256D
42-269018A	42-661775B	

Return to field indicated by letter after number as keyed below

A—Coffeyville Army Air Field, Kan.
B—Lockbourne Army Air Base, Columbus 17, Ohio
C—WFTC, Orange County Army Air Field, Santa Ana, Calif.
D—Luke Field, Phoenix, Ariz.
E—Midland Army Air Field, Texas

HOW SHARP ARE YOU?

QUESTIONS

1. Excluding the cue ball, how many balls are visible on the table?
2. How many players are holding cue sticks?
3. Which side (facing reader) of the tally string shows the highest score?
4. How many pieces of cue chalk can be seen?
5. How many players are chalking their cues?
6. How many men are holding cigarettes?
7. Where is the ball rack?
8. Is the window open or closed?
9. Two of the Soviet players are wearing leather jackets. True? False?
10. Is the American officer's insignia of rank visible?

ANSWERS ON PAGE 46

BATTLE HONORS IN THE PACIFIC

From Port Moresby to Tokyo—traced in Distinguished Unit Citations

ILLUSTRATED BY S/SGT. ED COLLINS

The latest Distinguished Unit Citations to his organizations in the Southwest Pacific, awarded by General George C. Kenney, commanding general of the Far East Air Forces, are eloquent testimony to the effectiveness and heroism that figured in the U. S. air campaign in that theater. The awards were made "in the name of the President as public evidence of deserved honor and distinction."

Here AIR FORCE *publishes brief summaries of the actions covered by these citations. Except for a single citation to the 307th Bombardment Group (H) in August of 1944, they were the first unit awards made in the Southwest Pacific for two years. In most cases the citations acknowledge the contribution of ground echelons in the combat achievements.*

The Distinguished Unit Citation is an Army award and should not be confused with the Navy's Presidential Unit Citation. Both are awarded in the name of the President, but they are distinguished by separate badges. The Army's is the familiar dark blue bordered in gold. When a citation is confirmed by War Department General Orders, all personnel assigned to the organization on the occasion or during the period for which the citation was made are entitled to wear the Distinguished Unit Citation badge as a permanent part of the uniform.

317th Troop Carrier Group, 5th Air Force

Strong enemy ground forces had penetrated into the Wau-Bulolo Valley, New Guinea, in an effort to capture the important Wau Airdrome, which was garrisoned by an Allied force too small to repulse the invaders. Planes of the 317th Troop Carrier Group and the 374th Troop Carrier Group made an unprecedented series of air movements to save the airfield, carrying Allied troops, ammunition, light artillery and supplies over the hazardous Owen Stanley range until late in the afternoon when treacherous weather would ordinarily have stopped aerial operations. With the loss of only three aircraft, these troop carrier groups flew a total of 948,000 pounds of personnel and material into Wau.—January 30—February 1, 1943.

374th Troop Carrier Group, Far East Air Service Command

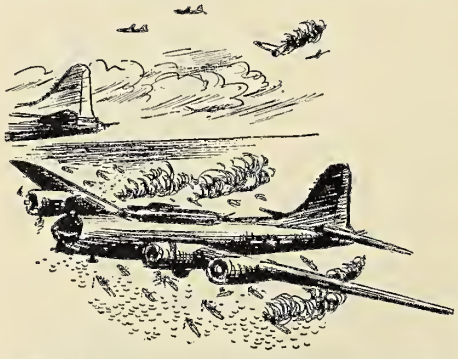
Same citation as for 317th Troop Carrier Group.—January 30—February 1, 1943.

40th Fighter Squadron, 5th Air Force

In a fierce battle near Wau Airdrome, New Guinea, this squadron distinguished itself by destroying 12 enemy aircraft with an additional five probables in a 25-minute action. The 40th squadron did not lose a single airplane.—February 6, 1943.

43rd Bombardment Group (H), 5th Air Force

In the Battle of the Bismarck Sea, B-17s of the 43rd group, operating out of Port Moresby, flew a total of 73 sorties in three days to help annihilate a convoy carrying reinforcements to the Jap base at Lae, New Guinea. In repelling hostile aircraft, often while voluntarily covering medium and light bomb units, this group shot down at least 45 Jap fighters and probably destroyed 16 others. The complete destruction of the entire convoy was the most decisive single



blow at Jap operations in Southwest Pacific up to that time.—March 2, 3 & 4, 1943.

39th Fighter Squadron, 5th Air Force

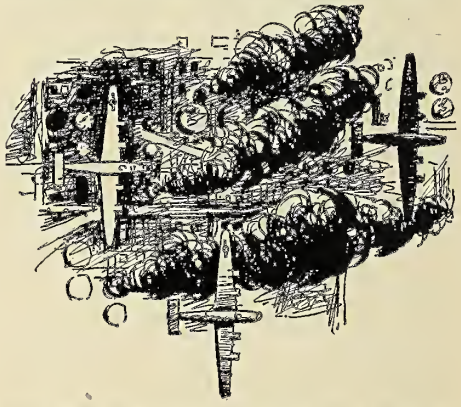
In destroying 17 enemy aircraft during a three-day period in Huon Gulf, New Guinea, the 39th Squadron contributed substantially to the blasting of a large convoy in the Battle of the Bismarck Sea. The P-38s of this squadron scattered an enemy formation covering the convoy so effectively that bombing runs on March 3 were made at masthead level with no opposition from the air.—March 2-4, 1943.

8th Fighter Squadron, 5th Air Force

Fighting against a far superior enemy force, this squadron destroyed 14 enemy aircraft in a single operation. It was such a severe blow to the Japs that from May until September they did not chance another attack on Oro Bay area in New Guinea.—May 14, 1943.

380th Bombardment Group (H), 5th Air Force

To reach the refinery area at Balikpapan, Borneo, B-24s of this group had to fly over hundreds of miles of open sea, past the heavily defended island of Timor and the Macassar area, and past listening posts for enemy fighter strips. Each of the missions involved at least 16 hours of flying, 10 at night, and six during daylight hours. Many of the bombers were damaged by shell fragments and enemy fighters, and some of



the B-24s flew the entire trip back home on three engines. As a result of the strikes, the flow of oil and gasoline to Jap tactical bases was seriously curtailed.—August 13-15-17, 1943.

41st Fighter Squadron, 5th Air Force

Disregarding the numerical superiority of the enemy, this squadron dived on Jap bombers from an altitude of 12,000 feet and pressed an attack which destroyed nine bombers and two fighters. The enemy, attempting to attack the new Tsili Tsili airdrome, was able to drop only two bombs with no damage resulting.—August 15, 1943.

3rd Bombardment Group (L), 5th Air Force

Twenty-two B-25s of this organization, then a medium bomb group, participated in a major blow against airdromes at Wewak, where the Japs had concentrated more than 200 aircraft. They attacked at treetop level in the face of intense antiaircraft fire and plastered the Boram and Wewak airdromes with strafing fire and parafrag clusters. At Boram, 25 enemy planes were destroyed on the ground and 30 were severely damaged. At Wewak all bombs fell in the target area and nearly every airplane on the field was destroyed. As a result of this mission, the enemy was compelled to abandon his plan of maintaining an effective air striking force south of Hollandia.—August 17, 1943.

475th Fighter Group, 5th Air Force

In Wewak operations, this group maintained formation throughout a heavy enemy air attack, defending its own planes and protecting a bomber formation, destroying 38 Jap planes and getting six other probables. The B-25 formation was covered so effectively that it was able to make unmolested strafing runs which destroyed 178 enemy aircraft on the ground. This operation greatly weakened the enemy positions and hastened the defeat of the Japanese in that area.—August 18 & 21, 1943.

80th Fighter Squadron, 5th Air Force

The 80th, forming part of an escort for B24s, fought off the attacks of 30 to 35 Japanese fighters at Wewak, destroying nine Jap planes and probably one other. This was August 20. The following day, 16 P-38s of this squadron shot down 11 enemy planes and thus thwarted an interception of the B-25s for which they were providing close cover. On August 29, fighters of this squadron were recalled from an escort mission because of bad weather, but two pilots who failed to receive the message went into the target area as sole cover for a B-24 attack on Wewak and shot down two enemy fighters. On September 2, the squadron destroyed six planes, and September 13 and 15 got a total of 12 more. During this period the pilots of the 80th shot down 40 enemy aircraft.—August 20—September 15, 1943.

90th Bombardment Group (H), 5th Air Force

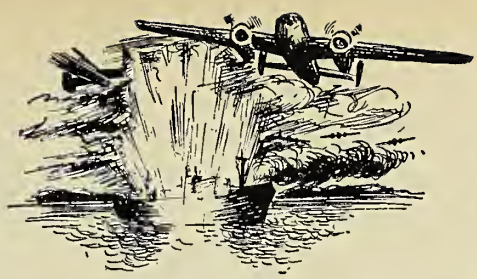
The 90th carried out strikes on the Jap air stronghold at Wewak. Its airmen battled their way through Jap fighter opposition and heavy antiaircraft fire. They met 149 Jap aircraft in combat and destroyed 46 of them with an additional 11 probables. They destroyed 22 on the ground and damaged many more that could not be counted. An ammunition dump was blasted and at least eight fires were started in the fuel stores and supply dumps.—September 13 & 15, 1943.

475th Fighter Group, 5th Air Force

In action at Oro Bay, P-38s of this group destroyed a formation of 22 Jap dive bombers and allowed only seven protecting fighters to escape. Pursuing the remnants almost to New Britain, they met another formation of 50 enemy fighters, which turned about and avoided combat. In destroying 22 dive bombers and 15 fighters and damaging other aircraft, this group prevented a serious loss to vital American shipping. On October 17, two squadrons of this group intercepted 30 enemy fighters approaching Oro Bay and scattered the formation, bagging at least 19 Jap fighters. This brought the total for two days of combat to 56 enemy planes destroyed and eight probably destroyed.—October 15 & 17, 1943.

500th Bombardment Squadron (M), 5th Air Force

As part of a coordinated assault on targets in the Rabaul area, nine B-25s of the 500th Bomb Squadron set out to bomb and strafe targets between Vunapope and Lesson Point. Only six got through to the



target. At treetop level, they thoroughly strafed the camp and supply areas, and undaunted by heavy antiaircraft fire, they crossed the shoreline and overturned a 5,000-ton freighter with two 1,000-pounders. Then they demolished a corvette and a 6,000-ton freighter. At this point they were attacked by 40 to 50 Jap fighters coming in from all directions. The running battle lasted an hour and 10 minutes, resulting in the destruction of 14 Jap planes and many other probables, and with the loss of only two B-25s.—October 18, 1943.

9th Fighter Squadron, 5th Air Force

In a two-week period, flying missions through severe tropical weather over 300 miles of water which was largely Jap-controlled, this squadron destroyed 24 enemy planes and probably destroyed seven more, in addition to providing effective cover for our bombers. These strikes contributed greatly to the neutralization of the enemy in New Britain.—October 23—November 7, 1943.

80th Fighter Squadron, 5th Air Force

In destroying at least 26 enemy aircraft and probably seven others in a two-week period, the 80th materially aided in the neutralization of Rabaul. This series of missions involved the longest fighter flights up to that time in the SWPA and demanded exceptional courage and skill on the part of pilots.—October 24—November 7, 1943.

345th Bombardment Group (M), 5th Air Force

Thirty-seven B-25s of this group led a bomber attack against ground fire installations protecting Simpson Harbor, Rabaul. They effectively bombed and strafed antiaircraft and machine gun positions, shore installations, barracks, and supplies. Two freighters unloading at the docks were set on fire, and the town was covered with white phosphorous smoke bombs which screened attacks made by other units against shipping in the harbor.—November 2, 1943.

22nd Bombardment Group (H), 5th Air Force

On November 5, the 22nd group, then consisting of one squadron of B-26s and three squadrons of B-25s based at Dobodura, New Guinea, was designated to wipe out Japanese positions holding up Australian ground troops in Faria River Valley. Cloud cover over the target forced the formation down to a dangerously low altitude, but the squadrons chose to press their attack. They accurately pinpointed over 23 tons of bombs, and every known enemy position in the area was destroyed, enabling the Australian troops to advance and drive out the remaining Japanese.—November 5, 1943.

348th Fighter Group, 5th Air Force

The gallantry of its pilots, many of them inexperienced in combat flying, enabled the 348th Fighter Group in a period of 16 days to destroy 79 enemy aircraft in the air with a loss of only two of its own, a ratio of almost 40 to 1. The combat performance of this organization made an important contribution to the neutralization of the enemy in the Bismarck Archipelago.—December 16-31, 1943.

38th Bombardment Group (M), 5th Air Force

Making their target runs on the western tip of New Britain at the dangerously low altitude of 50 to 100 feet, B-25s of this group accurately bombed and strafed the Cape Gloucester, New Britain, airdromes, enemy pillboxes, barges, supply dumps and personnel areas from Dorf Point to Cape

Raoult. American troops moving into the area later found over 1,000 enemy troops had been killed and most of their equipment and supplies destroyed by the treetop bombing and strafing. Thus the enemy was so effectively neutralized that our own ground losses were negligible.—December 24-26, 1943.

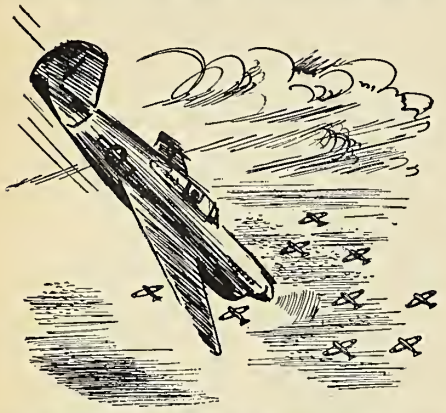
35th and 36th Fighter Squadrons, 5th Air Force

In an operation at Cape Gloucester, New Britain, these squadrons were attacked by 75 enemy aircraft, a numerically superior force. Nevertheless, the 35th and 36th destroyed 21 Japanese aircraft and probably destroyed five others, all the while continuing to press their attacks. After more than one-third of their force was destroyed, the Jap units abandoned the mission and retired from the convoy area. The aggressive courage of the pilots of the 35th and 36th squadrons saved many lives and much vitally needed equipment and dealt a crippling blow to enemy airpower, aiding materially in the occupation of Cape Gloucester.—December 26, 1943.

35th Fighter Squadron, 5th Air Force

This squadron destroyed 18 enemy aircraft while protecting a U. S. convoy carrying supplies to the newly won beach-

head at Saidor. Remaining enemy fighters retired from the engagement with several P-40s in close pursuit. During the chase, one of the 35th's fighters dived into the mist on an enemy formation of nine dive bombers, shot one of them down and scattered the others. The daring of these pilots, many of whom had had no previous combat experience, inflicted severe loss to the Jap air strength and also prevented a large-scale attack on troops and supplies needed to



strengthen a newly won and vitally important beachhead.—January 16, 1944.

6th Recannaissance Group, 5th Air Force

As part of the pre-invasion mapping coverage needed for the Leyte-Samar-Dinagat area, this group was directed to complete first priority photography on Leyte within a week. The 1,530-mile round trip, into an area where the probability of enemy interception was great, was made without fighter protection. The task was completed September 25 despite the necessity of flying through extremely hazardous weather fronts. —September 18-25, 1944.

499th Bombardment Squadron (M), 5th Air Force

This squadron, providing air cooperation for the strategically important landings at Los Negros, Admiralty Islands, encountered such turbulent weather that its formation would have been justified in turning back. Realizing, however, that the success of the landing depended upon effective air cover, the crews continued to the target, relying entirely upon instruments. Due to expert piloting and navigation, it was the only squadron to get through and prepare the way for the ground assault.—February 29, 1944.

5th Bombardment Group (H), 13th Air Force

Braving intense antiaircraft fire, navigating and bombing with superior accuracy, the 5th group in less than a month was largely responsible for reducing a base upon which the Japs had depended for an uninterrupted flow of supplies and aircraft for the strategic defense of Truk, Palau and the western Caroline and Marianas Islands.—April 18—May 15, 1944.

380th Bombardment Group (H), 5th Air Force

This group performed outstanding service in keeping enemy airstrips on Noemfoor Island permanently unusable and preventing the flow of Jap replacement aircraft and crews to the area of operations. The group flew repeated missions into the target area, each flight requiring 12 hours in the air to accomplish a round trip of 1,800 miles over enemy-held territory.—April 20—May 17, 1944.

17th Reconnaissance Squadron, 5th Air Force

Ten B-25s of the 17th Squadron were ordered to intercept and destroy a Japanese naval task force which was reported carrying reinforcements to the island of Biak, Dutch New Guinea. The exact size of the force was undetermined. Contacting the enemy force off Waigeo Island north of Dutch New Guinea, the 10 crews of the 17th Reconnaissance Squadron discovered that it was composed of four destroyers and two cruisers protected by 10 aircraft. Although an attack on six heavily armed warships by a single squadron was almost suicidal, the B-25s descended to minimum altitude, and dropped 500-pound and 1,000-pound bombs, destroying or sinking all four of the destroyers and forcing the cruisers to turn back. Three B-25s were lost and five were seriously damaged.—June 8, 1944.

5th Bombardment Group (H), 13th Air Force

To reach their target at heavily-defended Balikpapan, Liberators of this group had to fly a round trip of 2,610 miles entirely over water and enemy-held territory, the longest daylight mass formation bombing mission ever undertaken by B-24s. The normal ammunition supply had been cut in half, and the bomb and fuel load was the heaviest ever carried by B-24s in the Southwest Pacific area, 12,000 to 13,000 pounds greater than the recommended load for B-24s. Attacked for more than an hour by about 30 enemy fighters and facing heavy antiaircraft fire more intense and accurate than any they had ever encountered, the B-24s nevertheless dropped their bombs with excellent results.—September 30, 1944.

307th Bambardment Group (H), 13th Air Force

En route to press attacks on Balikpapan, this group encountered enemy interception even heavier and more aggressive than had been anticipated. For an hour and 15 minutes, 30 to 40 Jap aircraft from a new airstrip attacked the formation. Losing seven Liberators, the group fought through the fighter opposition and terrific antiaircraft fire to bomb the refineries effectively.—October 3, 1944.

38th Bombardment Group (M), 5th Air Force

November 10, 30 B-25s of the 38th Group attacked a Jap convoy attempting to land reinforcements on Leyte. It was one of the largest and most strongly defended convoys ever to be attacked by a single group in SWPA. Flying in the face of murderous antiaircraft fire from the freighters as well as the destroyers, the B-25s attacked at masthead level. They sank three destroyers, one destroyer escort, and at least five freighter-transports. Three transports and one destroyer were severely damaged. Five B-25s were shot down and two were forced to land on the water. The enemy attempt to land more ground troops was crushed. —November 10, 1944.

25th Liaison Squadron, 13th Air Force

Flying light, unarmored L-5 airplanes, this squadron dropped food, ammunition, medicine and other supplies to units of the 11th Airborne Division, cut off from other supply sources on Leyte, and pioneered in the technique of establishing and servicing advance field hospitals with small planes. Operating without fighter protection, these aircraft were constantly subjected to enemy ground fire, which damaged the majority of the L-5s used in these missions.—December 10-25, 1944.

317th Troop Carrier Group, 5th Air Force

In the recapture of Corregidor, 51 of the group's C-47s dropped a total of 1,021 paratroopers and 151 bundles of supplies in a period of one hour on the morning of February 16. In nearly an hour and a half on the afternoon of the same day, 50 C-47s dropped 978 paratroopers and 159 bundles. On the morning of February 17, 43 C-47s

dropped 197 bundles in less than an hour. On the afternoon of February 17, during a period of nearly two and a half hours, 785 bundles of supplies were dropped by 33 C-47s. In all, approximately 563 passes had to be made to put the 1,999 paratroopers and 1,292 bundles on Corregidor.—February 16-17, 1945.

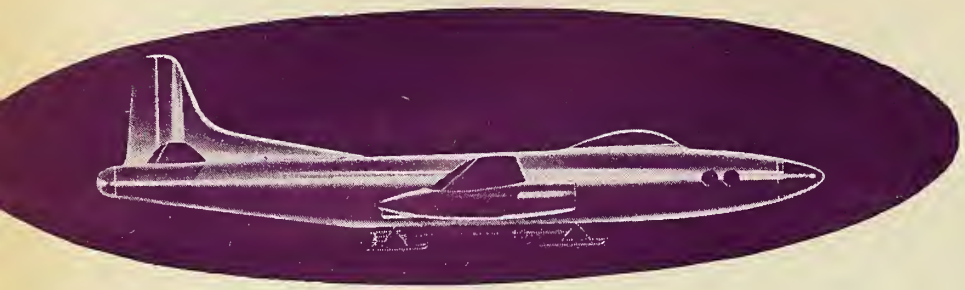
312th Bombardment Group (L), 5th Air Force

During this period, the A-20s of this group, based in the Philippines, completed eight strikes on Formosa against Japanese plants producing butanol, an important component of aviation gasoline. Because of the extreme distance, no A-20s had previously attempted raids on these installations. Attacking at roof-top level, the light bombers left each plant in flames.—March 25—April 4, 1945. ☆

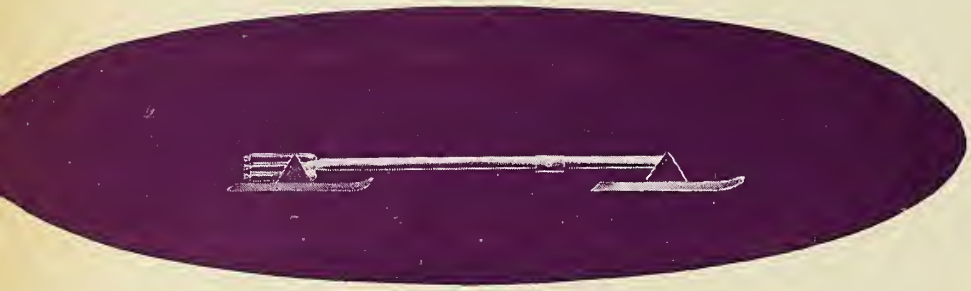
technique

Development, Maintenance and Supply
of Aircraft and Equipme

Radio-Controlled Target Plane — Page 42

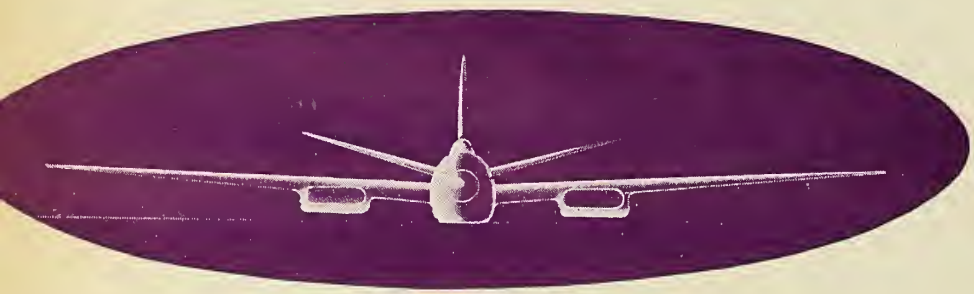


With plane fully loaded, rocket sled is put in place for take-off.

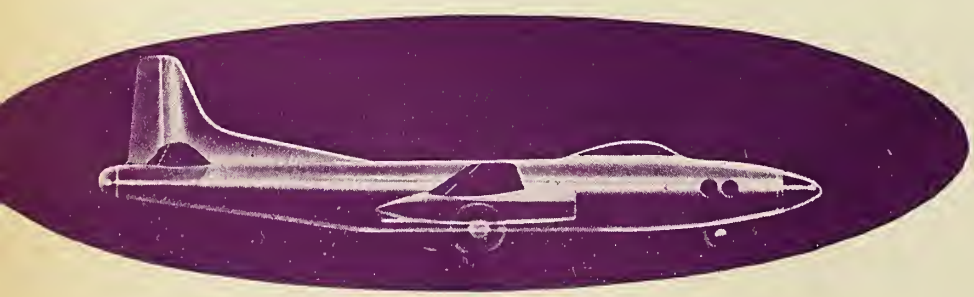


Rocket sled is of light magnesium construction, skims along field.

Take-off is accomplished in run of 500 feet at a speed of 150 mph.



Having no landing gear, the plane makes belly landing on sod field.



Aircraft has utility wheels, however, to facilitate ground handling.

Rocket Sleds for Take-Off

Jet aircraft, which do not have propeller clearance problems, take off and land from short, stubby gear. These wheels, although conventional in design, may soon be replaced, on some airplane types, by rocket sleds that will enable take-off in the manner of a robomb launching, and permit the craft to make a landing by skidding across a sod field on its flattened belly and special sled-nosed nacelles.

For taxiing, the plane will carry a retractable "jacking" gear which can be lowered to the ground to raise the fuselage high enough so that the "jep" craft may taxi on its own wheels. To take off, the plane taxis over a rocket sled, retracts its jacking gear so that the fusclage rests on the launching device, and after engine warm-up, is hurtled across the field and into the air by the rocket-powered sled. Unlike the launching car of the robomb, however, the sled will not rise with the plane, but will remain on the ground.

The new system of take-off and touch-down, in addition to saving hundreds of pounds of weight, would reduce the size of the gear so that more room would be available for fuel and payload. Also, take-off distances would be considerably shortened through the elimination of the drag of standard gear. Such an installation, however, could not be used for propeller-driven planes, which must still rely on conventional landing wheels.

Fuel Injection for B-29s

Instead of mixing gasoline and air in a conventional engine's fuel-air chamber, a new method is being adopted for B-29 engines to squirt gasoline directly into each cylinder of the R-3350 engine and thus improve cooling, reduce fuel consumption and minimize fire hazards.

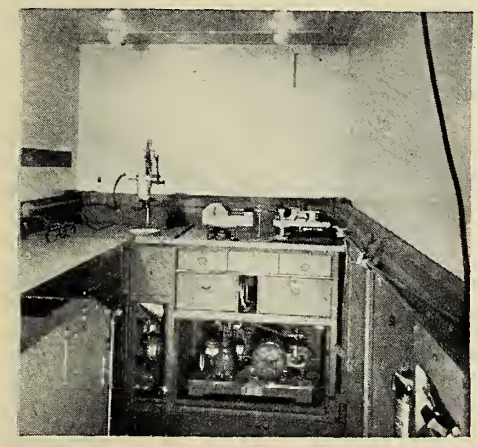
The system comprises a fuel-air metering control device, two injection pumps—one for each bank of nine cylinders—feedlines and nozzles. The control meter feeds a measured amount of gasoline and air through separate channels to the cylinder. The high-pressure injection pumps then force the gasoline through small-diameter tubing to each cylinder, and a nozzle at the end of each tube sprays the fuel inside the cylinder to permit even burning. Simultaneously, air flows through the induction system into the cylinder air intake and mixes with the gasoline to form a combustible ratio.

In field tests, the system has proved that maximum cooling may be obtained

with reduced opening of cowl flaps, and that a cleaner mixture of gasoline may be used because of more equal distribution. As applied to combat, these advantages may well mean increased horsepower, smoother engine performance and greater range.

Portable-by-Air Workshop

Lightweight, collapsible workshops that could be transported by air and set up at advance bases were used by the AAF for the adjustment and repair



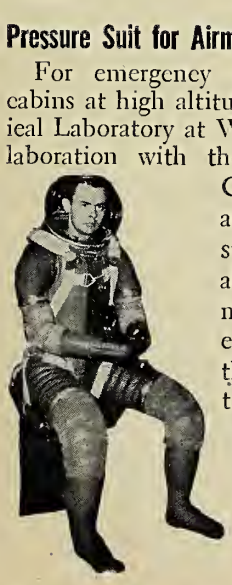
Interior view of lightweight, airborne workshops set up at advanced bases for the repair of bombsights and computing sights.

of bombsights and computing gunsights. Equipped with precision tools, the fireproof, temperature-controlled shop enabled instrument specialists to perform fourth echelon maintenance on the spot, saving the time that would be required to send the sights to depots in rear areas.

Flexible boards made of compressed, resin-treated glass fibers were employed as insulation to help maintain a humidity-free atmosphere inside the workroom.

Pressure Suit for Airmen

For emergency use in pressurized cabins at high altitudes, the Aero Medical Laboratory at Wright Field, in collaboration with the B. F. Goodrich Co., has developed an air-tight pressure suit which will enable a man to breathe normal air in the event of failure of the pressurizing system of the cabin.



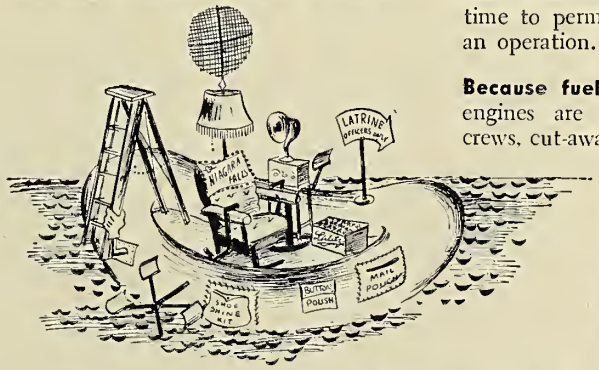
Simulating flight position, man wears new pressure suit. Pilot is still able to move with ease.

tech topics . . . about aircraft and equipment

In present models of the A-26 the pilot's seat has been raised five inches and the cockpit redesigned to give better vision. Changes improve sightline over the engine nacelles and help facilitate formation flying. . . . Armament modification in the Invaders includes three .50s in each wing as standard equipment to replace temporary package gun installations. With eight machine guns in the nose, six in the wings and the four guns of its two remotely controlled turrets the A-26 now has an 18-gun forward fire. In addition, it carries 14 rocket projectiles. . . . On models that don't have the 75-mm cannon, dual controls have been included to give the pilot an assistant on long-range missions. . . . The new attack bomber also has beefed-up nose gear struts to prevent folding up during taxiing and rough ground handling.

A portable meteorological station which consists of all the ground meteorological instruments required for operating a small weather station has been developed for use in advanced areas. Packaged in large crates which can be converted into work benches, the equipment can be shipped by truck, airplane or glider. It is ruggedly built and can be dropped by parachute.

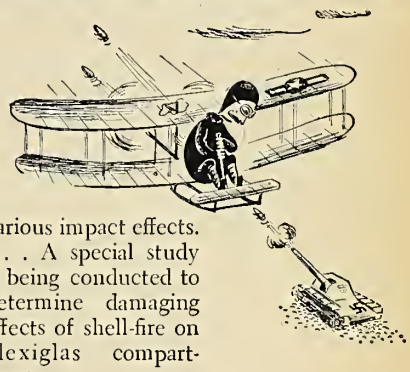
These modifications are being made to the Type A-3 life raft to increase its worthiness: a ladder with hand-held extension extending from one side of the raft to the other; sewing of all auxiliary kits and pouches to the raft as well as rubber-cementing to prevent loss of emergency equipment; changes in water ballast pock-



ets, oar blocks and righting handles to make the raft more sea-worthy and controllable. . . . A new radar device designed for installation in all life rafts automatically "locates" the rafts at sea for searching fliers.

To overcome odorous air in ambulance planes which has been known to limit crew efficiency, engineers have developed a small purifier that deodorizes blankets and cabin air. Consisting of a small canister of activated carbon, a hose attachment and a small 27-volt motor, the unit, which operates on the plane's electrical system, weighs less than 2 pounds and is placed under the blankets at the feet of the wounded. It sucks about 10 cubic feet of the sub-blanket air per minute through a purifier and sends it fresh and pure into the cabin with no draft effect on the patient. . . . With minor modifications the deodorizer can be used in a crowded hospital ward.

Latest machine gun for aircraft installations fires a bullet that is larger than a 20-mm cannon shell. Having very high muzzle velocity, the weapon can fire 600 rounds per minute. . . . Tests are being run using German guns and ammunition fired against obsolete U. S. planes to study



various impact effects. . . . A special study is being conducted to determine damaging effects of shell-fire on plexiglas compartments.

A small camera which uses "Bantam" roll film has been fitted with a special "surgiscope" to permit photographing open wounds. Inside the "surgiscope" or jacket in a sealed compartment are eight flash bulbs which can be fired one at a time to permit making a picture-series of an operation.

Because fuel injection systems for B-29 engines are new to most Superfortress crews, cut-away models have been designed for teaching the principles of operation, adjustment and maintenance of these systems. The working models will soon be standardized for distribution to various training units.

One B-24K airplane has a completely smooth molded plexiglas nose which eliminates complex framework familiar to conventional models and permits increased streamlining and improved vision. The same airplane has a large single rudder and the combination nose and tail arrangement increases both speed and stability.

A new dual-purpose camera that uses 70-mm film and has high-speed shutters and an extremely fast cycling rate is under construction. The camera's high-speed characteristics and the shutter range of 1/500 to 1/2000th will make it ideal for fast-flying photo ships.

The suit is a form-fitting garment blown up by a compressor unit to which it is attached by a long hose. Metal joints permit flexibility at the elbows, shoulders and knees, and a transparent "goldfish bowl" covers the head like a diver's helmet.

Under pressure, the suit will restrict its wearer to an extent, but he will be able to operate the controls normally or pull the ripcord on a parachute if bail-out becomes necessary.

C-74 Super Skymaster

Shipment of heavy freight by air has been facilitated considerably by the production of the Douglas C-74, a four-engine aerial cargo carrier half again the size of our largest in-service transport, which is capable of flying from New York to Los Angeles with 20 tons of freight—twice the bomb load of a B-29.

Loading and unloading methods feature two electric hoists, one of which lifts cargo up through a bottom door like a freight elevator, and another which hoists equipment through a side-door through the use of a boom arrangement. By means of an overhead conveyor, a 15,000-pound piece of freight can be run along the full length of the cargo compartment on two rails and placed in its best position for efficient balancing. No matter where crates are stowed, however, the C-74 maintains stability on its tricycle landing gear and does not tip back on its tail as other planes have been known to do. Moreover, the tri-gear has a steerable nose wheel which enables the pilot to maneuver the airplane on the ground as he would control an automobile.

A crew of five is required to operate the big plane—pilot, copilot, radioman, navigator and flight engineer—while additional accommodations are available for a relief crew so that personnel may work in shifts on long hops. Instead of the forward window arrangement for the pilots, there are two "bug-eyes," resembling a pair of bubble canopies mounted in parallel, which provide increased visibility for ground handling and improve the craft's streamlining. Below and to the rear of the cockpit are the crew's quarters, offering full-length bunks, a small galley and a private washroom.

Power for the plane comes from four P&W 4360 engines, each capable of developing 3,000 hp at take-off. All nacelles are interchangeable and a complete engine change can be accomplished in less than an hour. A tunnel along the leading edge of the wing permits a man to crawl into each of the big engine housings and make minor repairs in flight, while heating units in the wing ward off ice formations.

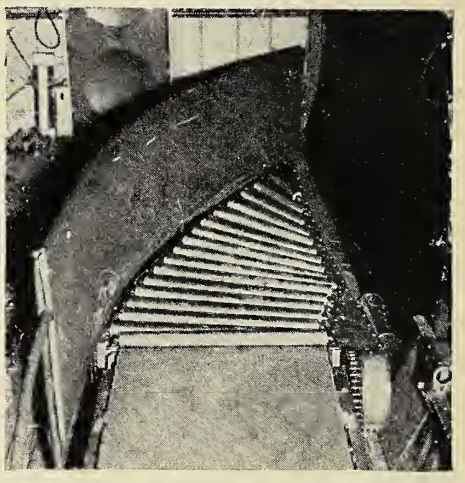
The C-74's range is estimated at twice that of existing transports, making a hop from New York to Moscow a routine non-stop operation. Since the cabin is not pressurized, altitude is maintained at between 10,000 and 15,000 feet, and speed is estimated at around 300 mph.

The C-74, Super Skymaster, (below) is largest carrier plane in service. View at right shows large space for storage and overhead rail.

Rapid Cargo Unloading

A 4,000-pound cargo could be dropped from a C-47 in about 60 seconds, using a conveyor belt system that permitted the full load to pass out over the drop point in a single pass, thus allowing the unarmed transport to make a quick getaway.

A factory-style conveyor belt was driven by a small electric motor which took juice from the plane's power system. Extending from behind the pilot's compartment to the rear door of the plane, the belt ran at the rate of about six feet per second on heavy rollers which kept it from buckling when heavy cargo containers were placed on it. At the door, a roller-bearing chute launched the packages into the air where they parachuted down.

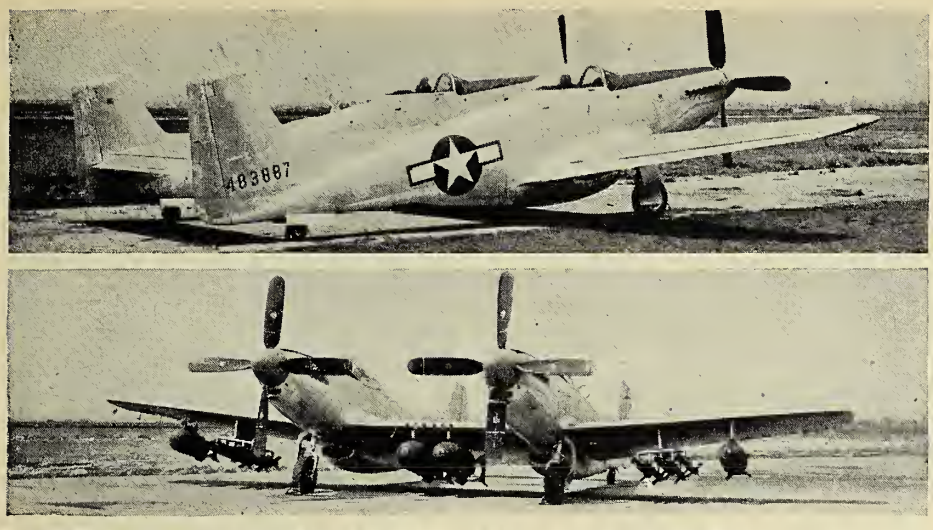


With cargo door open, moving belt conveys airborne supply packages to a roller chute which rapidly ejects them into airstream.

XP-82—Twin-Fuselage Mustang

At the time that the AAF was seeking a long-range fighter to escort B-29s over Tokyo, one of North American Aviation's engineers suggested that two P-51H fuselages be placed on a single wing in order to obtain a two-place fighter with a great internal gas capacity plus high performance at top speed. Today, that plane—the XP-82—is in the air as a new design, with the two fuselages being mounted in parallel on a wing one-fourth larger than that of the Mustang alone, with the aft portion of each fuselage being lengthened by three feet, and with a large stabilizer giving the craft a twin-boom effect. The dorsal fin of each fuselage has also been enlarged, but the retractable landing gear has not been changed.

The XP-82 is an extremely versatile design that can be used as a night fighter, an attack plane, a long-range



Two P-51 fuselages on a single wing from the AAF's new long-range fighter plane, the XP-82. Fork tail and double cockpit arrangement are features, as well as added firepower and bombs.

escort, an interceptor and a fighter bomber. As a night fighter, radar equipment is slung under the wing in a special nacelle, and it is possible to put the operator in one of the cockpits while the pilot flies the plane from the other. For ground strafing, the craft's 14 machine guns—six in the wing and eight more in a package—adds up to more firepower than any other fighter is able to muster. With externally hung fuel tanks, in addition to its internal capacity, the plane can accompany its "Super Big Friends" almost anywhere, while a special heated-wing installation relieves the pilot of worry over icing conditions on long hops. To qualify as an interceptor, a flush-type "turtle-back" cowling fits over the cockpit on the copilot's side and turns the plane into a single-placer within minutes, while four 1,000-pound bombs can be carried under the 51-foot wing to make the plane measure up as a formidable short-range fighter-bomber.

The double Mustang has a control arrangement similar to that in a side-by-side cabin, with the difference being the distance that separates the two piloting positions. The cockpit on the left side is the one in which the pilot sits, while the copilot occupies the other. The pilot has autopilot, flight, engine and navigational instruments at his position, while only the necessary flight instruments and a lone compass are available in the copilot's cockpit. In both places, however, the man not flying can recline on an adjustable seat and rudder pedals can be disengaged so that he can stretch out with comparative ease.

Power for the XP-82 comes from two Packard in-line engines, each of which are capable of developing about 1,300 hp at 30,000 feet.

Giant AC Generator

In anticipation of large new airplane models, a powerful 400-cycle AC generator has been developed as a primary source of electrical power for aircraft. The generator weighs 80 pounds and produces four times the power of DC generators, developing 30 kw, the equivalent of a 40-hp engine.

An important combat feature of the new generator is a three-to-one safety factor which guarantees power when wires are cut or damaged by enemy fire. Having three lead wires to its motors, the generator will operate at 80 percent maximum power when one lead is shot away and will continue to produce 50 percent of its potential with two leads gone.

The equipment was developed by General Electric and Westinghouse engineers to specifications set up by ATSC's Equipment Laboratory.

what's wrong with this picture?

Here's a chance to air your views on the proper care and maintenance of oxygen cylinders, using Handbook No. 03-50C-3 for additional pressure. If it will make you breathe any easier, we can reveal that there are at least six mistakes that you can huff and puff about—but before you follow your nose to Page 43 and switch over to the answers, try to locate a few more leaks that have to be plugged. Lending atmosphere to the scene are Cpl. Sheldon Kaufman, Cpl. Charles Stutelberg and Pvt. Jim Smith —all of Wright Field's Aero-Med Laboratory.

High-Speed Parachute

A German parachute that was issued to pilots flying the ME-262 jet-propelled fighter is being tested at Wright Field to determine if any special features have been incorporated for lessening the shock of openings at high speeds.

The chute canopy is encased in a "stocking" cover and consists of 288 flat cloth ribbons, each about two inches wide, that join at the apex. It is packed in an ordinary seat-type canvas knapsack carrier and has a one-point, quick-release harness buckle. There are 12 main shroud lines and 126 secondary lines. Each of the lesser lines is fastened to a pair of the ribbons, and when a load is exerted on the canopy, the shroud lines draw together, forcing the ribbons to overlap.

In operation, a small pilot chute which is spring-ejected pulls out the canopy, slips off the "stocking" and leaves the chute free to open. Above a certain speed or air load, the ribbons of the canopy separate, allowing a free flow of air through the openings until speed is reduced enough to permit the load on the shroud lines to close the gaps.

Drop tests now being conducted are expected to furnish information on opening shock, rate of descent and canopy shape during descent.

Radio-Controlled Target Planes

During the training of B-29 gunners, who were being schooled in the operation of the Superfort's remotely controlled turrets, it was not uncommon for someone to yell, "RAT at three o'clock!"

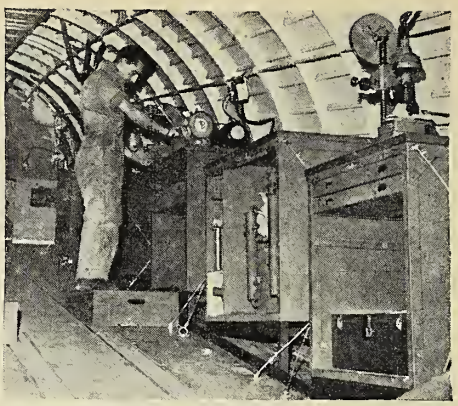
The designation referred to Radio Airplane Target, and meant that one of the AAF's OQ-3 radio-controlled model planes was diving at the bomber to simulate an enemy fighter, and would execute sharp evasive maneuvers until hit, whereupon a parachute would open from the pilotless craft's fuselage and the plane float to the ground.

The RAT is powered by a twin-cylinder, 6-hp engine which turns dual counter-rotating wooden props. Launching is accomplished from a portable steel catapult and landings are effected by the radio-released parachute, with a two-wheel landing gear helping to absorb some of the touch-down shock. The fuselage is almost 9 feet long, wingspan is 12 feet and overall weight is approximately 110 pounds. It is controlled from the ground by a pilot who operates a simple miniature control stick connected to a radio sending set. The plane is tuned in on a special frequency which actuates rudder and elevator movements, and radio control is effective up to a range of about five miles, although the plane must be within telescopic sight of the controller at all times.

As an outgrowth of the RAT, experiments were conducted with radio control of full-size target planes, resulting in the development of the PQ-8A, a low-wing, fixed gear craft, which could be controlled from a "mother" plane. A speed of 120 mph could be attained by the craft, and altitudes of 15,000 feet could be approached in order to simulate almost any type of attack against ground gunners. Wingspan was 26 feet, 11 inches, weight was in the neighborhood of 1,200 pounds and power came from a 113 hp Franklin engine.

Flying Repair Shop for B-29s

Whether forced down on a barren field deep in China or on an emergency strip on a Pacific atoll, grounded B-29s were quickly serviced and repaired. C-46 transport planes, outfitted as flying repair shops, came winging in to perform the job, and ever since their activation at Patterson Field, Ohio, in 1944, they have more than proved their worth in enabling damaged Superforts to return to base.



Modified as flying repair shop for B-29s, workbenches in the C-46 can be used inside the airplane or removed and set up outside.

The big cargo craft were loaded to capacity with specially built workbenches containing oxygen welding equipment, sheet metal apparatus, lathes, drill presses, air compressors and other items required for the repair of a flak-torn fuselage, wing or engine. These workbenches could be used inside the plane or removed and set up outside. A two-wheeled, rubber-tired trailer, also part of the unit, was used to transport the entire shop in one movement.

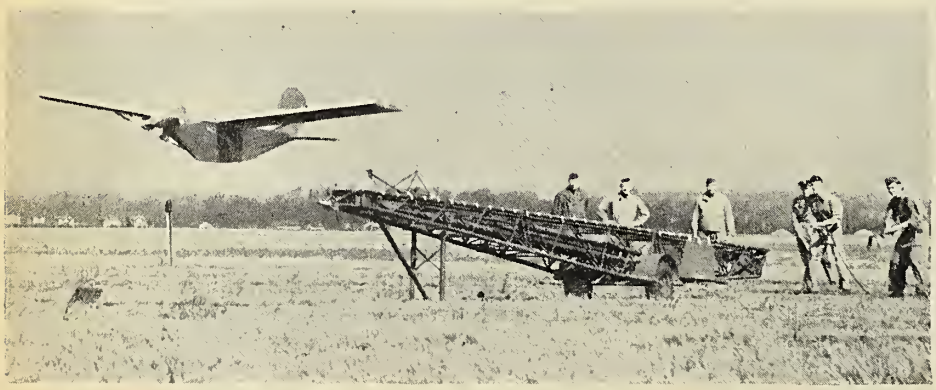
Because spare parts and stocks of metal were carried in a belly compartment, there was enough room in the plane's interior for a dozen or more mechanics to work at any one time.

Airborne Laundry

If you happen to be on a dusty Pacific Island, you may soon be able to toss about seven pairs of dirty fatigues into the Army's new airborne laundering unit, come back in an hour and find your uniforms washed and dried.

The laundry unit is packaged in four crates which fit inside a C-47 for transport anywhere the plane can land, and when it is set up for operation it is composed of a washer, an extractor and a hot-air dryer, along with a water pump and suction hose which can draw fresh water from natural sources to supply the washer, oil-burning water and air heaters, and a 110-volt, AC generator unit that runs off a four-cylinder gasoline engine to furnish power. The washer is of the rotary type similar to those used in commercial laundries, and the extractor is a perforated cylindrical container which whirls the wet clothing at high speed to throw out the water, eliminating the need for a wringer. Another tumbler receives hot air from a blower and serves as a dryer.

Nine hundred pounds of wash per day can be turned out by the unit.

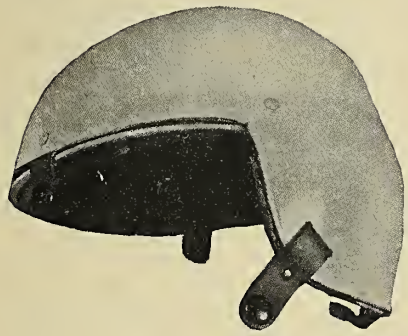


Radio controlled target plane being released from catapult arrangement for flight control is achieved from ground by operator who manipulates stick tuned in on the plane's frequency.

Clothes are in the washer about 20 minutes, in the extractor for about 15 minutes and in the dryer for an additional 20.

Headguard for P-80 Pilots

Since high-speed craft like the jet-propelled Shooting Star virtually "chop" their way through rough air, a lightweight plasticized helmet has been designed to protect a pilot's head from striking the low-streamlined bubble



canopies during sharp maneuvers. Looking like a football headgear, the helmet is an oval-shaped shell made of plastic-impregnated cloth which snaps on over a standard flying helmet. It covers the head and the base of the skull, and is so tough that an eight-pound steel ball can be dropped on it from a height of ten feet without leaving a dent. A non-cellular rubber lining is included, which is not affected by changes in pressure at varying altitudes. ☆

WHAT'S WRONG with the picture on Page 41

1. Starting with the man at the left, the mallet being used to straighten out the feed line can cause bending and make the line fail.

2. The greasy rag and the oil can nearby have no place in the picture, since lubricants seeping into oxygen lines can cause a combustible mixture that might easily explode.

3. Then too, the cylinder near his right elbow has its end plug removed, which might permit moisture to get into the oxygen.

4. Spotlighting the man in the center, cylinders should not be used for seats.

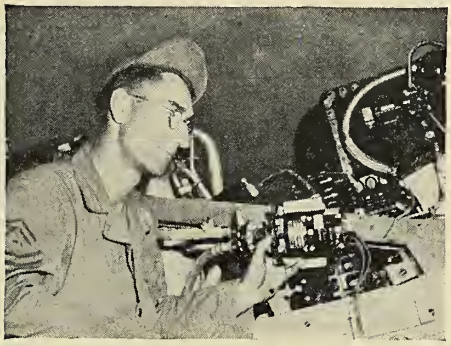
5. That long bar he is using to pry loose one of the containers may dent it and cause other damage.

6. The man at the right using the large wrench to remove the plug on the cylinder is applying excessive torque by using the wrong tool. A special gadget is available for removing the plugs.

on the line

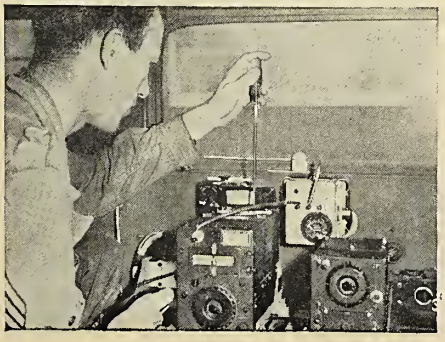
with mechs around the world

At his base in India, S/Sgt. Wade Eggleston, Middletown, Ohio, has built this hydraulic test stand from parts he was able to salvage from wrecked fighters and medium bombers. The apparatus is set on an ordinary prop stand and includes a motor from a P-40 hydraulic pump, a hydraulic tank from a P-51, a selector valve from a B-25 and tubing from the salvage depot.

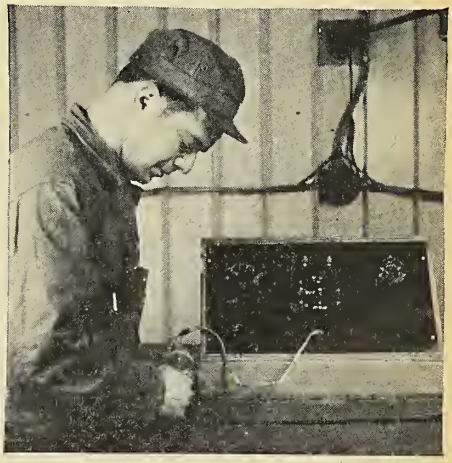


Realizing that hydraulic test stands for fighter planes are frequently AWOL when needed most, M/Sgt. Victor R. Lawson, Cisco, Texas, went on a reconnaissance mission among salvaged materials and spare parts chests at his 15th Air Force base and came up with his own design—a handy test device that checks hydraulic systems in fighter planes of his squadron.

A two-way radio communications system which enables maintenance trucks to have direct contact with the maintenance shop has been designed by S/Sgt. David A. Baty, Des Moines, Iowa, at the Avon Park, Florida, Army Air Field. The system eliminates necessity of relaying messages through the control tower and saves time and gasoline by cutting down on the number of trips necessary between the flight line and the shops. The receivers and transmitters of the two-way set are pre-tuned to the desired frequency and the controls are locked in that position. The switch box was constructed from scrap metal and spare parts, while the antenna was made out of alloy steel tubing. A safety switch controls the entire mechanism and enables anyone to operate the complete system, without previous instruction, by merely flipping the toggle.



When a drill combining high torque output at slow speed while utilizing an aircraft's 24-volt current was needed at a 5th Bombardment Group base in the Philippines, S/Sgt. Amsey Reed, Clarkston, Wash. (left) and Sgt. Charles Mosley, Princeton, Ky., (right) found the answer by taking a Du-More motor from a Martin ammo booster removing both sprockets from the motor and installing a chuck on the right end of the shaft.



Gunsight voltage regulators were checked speedily and efficiently at an 8th Air Force depot in England by this K-14 gunsight voltage regulator test panel constructed by Sgt. Jacob H. Graff, Brooklyn, N. Y. The device was operated from a universal test stand or 24-volt aircraft battery, and was precise in checking voltages to conform with T.O. specifications. The panel is made of ¼-inch phenolic sheet, and accessories are standard aircraft parts.

War Goods for War Veterans

BY CAPT. JESSE L. WALDEN
Hq., Army Air Forces

If you are like the majority of AAF personnel, you have seen, and used, many items of Army equipment that have caused you to say, "That's something I'm gonna take home with me."

Thousands of GIs feeling the same way have made definite plans to use surplus property in their own businesses when they return to civilian life. Many propose to utilize the same tools they are using in the Army.

A sergeant, now sweating it out in Italy, plans to convert his tiny ranch in California into headquarters for a radio repair shop. He wants to buy the counterpart of the radio repair equipment he has been using for three years and install enough of it to handle first through third echelon maintenance on a GI truck as a portable radio repair unit.

A former private has applied for steam presses, irons and other machinery needed for a cleaning shop. Voltmeters and hand tools interest another EM proposing to open his own electric motor repair shop. A lieutenant hopes to buy some furniture for his brokerage office in Chicago, while a major wants fixtures for a drugstore.

Another ambitious lieutenant is in the market for Army equipment for use in his night club. One officer plans to convert several six-man huts into laying and brooder houses for his chicken ranch near Fort Worth.

So it goes. A survey by the Army Service Forces indicates a large percentage of servicemen plan to strike out on their own. For these ambitious entrepreneurs, a benevolent government agency is ready to lend a helping hand by aiding discharged GIs to secure surplus property. In the enormous stockpiles of war materiel now becoming available can be found the equipment and supplies to establish a substantial portion of any business imaginable.

Section 16 of the Surplus Property Act of 1944 (Public Law No. 457) states: "The Board (Surplus Property Board) shall prescribe regualtions to effectuate the objectives of this Act to aid veterans to establish and maintain their own small business, professional or agricultural enterprises, by affording veterans suitable preferences to the extent feasible and consistent with the policies of this Act in the acquisition of the types of surplus property useful in such enterprises."

At present the Smaller War Plants Corp. is the buying agent for veterans desiring to acquire surplus property for business purposes. Already hundreds of veterans have bought surplus property directly from the Government to set themselves up and maintain themselves in business. They buy through SWPC, get preference and also arrange for loans or payment terms through SWPC, or they can be certified by SWPC to buy direct from government disposal agencies.

Former Naval Lt. Mike Norton was selected to head the Veterans Coordination Staff within SWPC. Norton not only is a medically discharged veteran of this war, but he is seasoned in government administration as well. A Government man for 12 years, he can talk the language of both the GI and the bureaucrat.

The SWPC plan to aid veterans to own their own shops is amazingly simple. To quote Mike Norton: "It's as simple as ordering from a Montgomery-Ward catalog." Here's the plan:

A serviceman decides exactly what property is required to get his business under way. After working out a program for a business that has a chance to succeed, he applies to the nearest of the 110 SWPC offices where he fills out and files a simple application. The latter is investigated to protect the veteran against inexperience and sharpers as well as to safeguard government funds. If the very reasonable and liberal standards are met, the veteran waits an average of 12 days and is then ready to open his business doors.

Naturally, certain criteria have been established. If property requested is to be used for the purpose of setting up a business, the invested capital of the proposed enterprise cannot exceed $50,000 and the veteran must own at least 50 percent of the stock. The venture must have a reasonable possibility of success. Automotive or similar equipment necessary to employment may also be purchased. A former limitation of $2,500 in purchases has recently been eliminated. If credit is desired, the applicant must not be a known deadbeat or failure.

All sales are under OPA regulations, but in no case will the selling price be greater than the cost to the government, less allowances for depreciation and obsolescence. For example, if you really want a jeep, it will cost you $983 less 15 percent if it is less than one month old. The price is progressively discounted up to 40 percent to three years, and 54 percent off when it is three years old.

As soon as the business consultant attached to the District SWPC office decides a veteran's chosen venture has a possibility of success, his application is sent through the regional office to a SWPC finder, who makes an immediate search for the property desired. If it can not be found anywhere, the application will be kept on file until the property does become available.

Immediately after the surplus goods are found, notice is sent to the prospective purchaser, giving the location of the merchandise, price and other details, and the veteran is given a chance to inspect the property before making the purchase.

If he decides to buy SWPC exercises its priority and purchases the property and then arranges delivery in any manner desired by the veteran.

If the veteran offers spot cash for his merchandise, he pays the same amount SWPC pays for it, plus shipping costs. If he desires credit he should so signify in his application, and his credit rating is checked by the SWPC Loan Bureau while search for the property is being made. He can also arrange to obtain credit through the disposal agencies.

Credit may be extended for durable goods for a period of five years, and the down payment may be as low as 15 percent. For example, a former sergeant needed only $315 for a $2,500 purchase of radio equipment, the unpaid balance to be paid in equal monthly installments. Maximum

time payments for consumer goods is limited to three years. In either case, the interest rate is 4% on the unpaid balance.

Loans for the purchase of property are not made in cash. The government merely transfers title from the War Department or other owning agency to SWPC, which in turn sells under the installment plan.

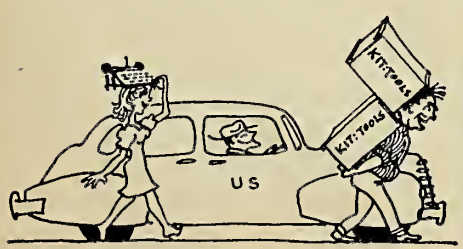
The application for both the purchase and credit is a radical departure from the usual government procedure. If cash is to be paid for the desired property, only 12 simple questions are asked. These questions include name and address of applicant; name and address of proposed enterprise; type and short description of enterprise; when the applicant plans to start operations; if enterprise is already established; size of enterprise, present and anticipated; short resume of training experience or education which the applicant believes assures his success; list of items desired, and, certification of eligibility to purchase. If credit is desired, six additional questions are asked, name and address of applicant's bank; banks to whom he may be indebted; two credit references; three personal references; other persons having a proprietary interest in the firm, and a financial statement of the enterprise if it is already established.

SWPC assistance does not end after the property is delivered. Regional SWPC loan agents may make production loans up to $50,000 without awaiting approval from Washington, or may enter into repurchase agreements with banks up to 80% of loans up to $100,000, where banks participate in the remaining 20% of the loan.

In addition, through the SWPC Technical Advisory Service each District SWPC office is prepared to find the answers to many of the veteran small business man's inevitable problems. The accumulated technical knowledge of many fields is at his disposal. The sources include the information stored in various government agencies, engineering colleges and universities, technical magazines and non-confidential data in industrial laboratories.

Furthermore, the veteran is invited to consult any District office regarding the 45,000 alien patents seized by the government at the beginning of the war, or about new inventions in his chosen field.

Maury Maverick, SWPC chairman, promises every assistance, with top priority long before war goods hit the open market. And don't worry if your point score is low. Uncle Sam promises that his surplus war materiel won't be surplus in quantity until he declares his fighting men surplus too. ☆



AAF QUIZ

Kick off on the Air Force Quiz again, crediting yourself five points for each correct answer. A score of 90 or above is excellent; 75 to 85 good; 60 to 70 not too bad; below 60, well. . . . see Page 47 for the answers.

1. S.A.E. as used in gasoline ratings, stands for
- A. *Sigma Alpha Epsilon*
- B. *Siphon Altitude Experience*
- C. *Society of Automotive Engineers*
- D. *Strength after Explosion*

2. For an AAF pilot to obtain a CAA license upon application he must certify he has flown 10 hours as first pilot in the year preceding
- A. *True* B. *False*

3. A Wind Rose is
- A. *A collection of vanes used in determining wind velocity*
- B. *Another nickname for Tokyo Rose*
- C. *A weather phenomenon, something like the aurora borealis, seen in the South Pacific*
- D. *A diagram showing wind strengths and directions in a given area*

4. BTO means
- A. *Big Time Operator*
- B. *Basic trainer operational*
- C. *Bombing through overcast*
- D. *Bombardment training operations*

5. Who is commander of the AAF forces in Europe?
- A. *General Weyland*
- B. *General Cannon*
- C. *General Vandenberg*
- D. *General Anderson*

6. The Japanese civilian who signed the surrender documents was
- A. *Shegimitsu* B. *Shidehara*
- C. *Togo* D. *Hokkaido*

7. Representatives of how many Allied powers signed the documents aboard the Missouri?
- A. *Five* B. *Nine* C. *Four* D. *Seven*

8. Signing for the United States was
- A. *General MacArthur*
- B. *Admiral Nimitz*
- C. *Admiral Halsey*
- D. *General Wainwright*

9. The first city on which an atomic bomb was dropped was
- A. *Nagasaki* B. *Tokyo*
- C. *Yokohama* D. *Hiroshima*

10. The YB-40 was
- A. *A twin-boomed bomber*
- B. *An AAF version of the Catalina*
- C. *An extremely heavily armed B-17*
- D. *A B-26 with fixed forward firing 37 mm cannon*

11. The XA-38, an experimental attack plane developed but not used tactically in this war, was built around a 75 mm cannon
- A. *True* B. *False*

12. The Republic Seabee is a twin-engine commercial seaplane
- A. *True* B. *False*

13. The Yellow Scorpions were
- A. *Yamashita's special attack corps on Luzon*
- B. *A P-51 outfit that operated in northern China*
- C. *Particularly poisonous insects found on Okinawa*
- D. *A B-25 squadron of the 7th Air Force*

14. Which of these Jap fighters is powered by two engines
- A. *Tojo* B. *Tony* C. *Zeke* D. *Nick*

15. The last air force to use the B-18 in combat was the
- A. *5th* B. *6th* C. *11th* D. *13th*

16. In making a cross-wind landing with a P-51, one of the first things to do is to drop the wing slightly into the wind
- A. *True* B. *False*

17. The new C-99, with pusher propellers, will have how many engines?

18. The F-7 is a photo version of the
- A. *B-29* B. *L-5* C. *P-38* D. *B-24*

19. General Spaatz was succeeded as commander of the United States Army Strategic Air Forces in the Pacific by
- A. *Gen. Giles* C. *Gen. Doolittle*
- B. *Gen. LeMay* D. *Gen. Kuter*

20. This is the tail of what airplane?

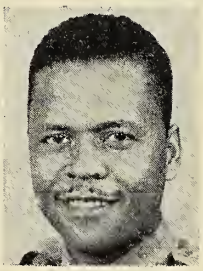
The Intercom

As a medium for the exchange of ideas, AIR FORCE presents these answers to its Question of the Month. Replies are those of personnel recently returned from combat duty in the areas indicated.

QUESTION: After the war, would you like to revisit the theater in which you were stationed?

Lt. Warren Eastwick, radar observer, New Guinea: "Definitely not. I like the idea of civilization too much to want to go back and visit that place. There are too many bugs and mosquitoes, and not enough of anything else. Matter of fact, there just isn't a thing to see in the whole country. They have towns on the maps, but when you find them they turn out to be nothing but a couple of grass huts. I am positive that I have seen enough of New Guinea — too much, in fact. I am definitely not a customer for one of those See-the-Pacific tours. Once there is too much for me."

Lt. Carrol S. Woods, pilot, Italy: "Yes, I would. I would like very much to see Italy in peacetime when it is back to normal. Italy is a very beautiful country, but I want to look at it when there are no guns or military aircraft around. I was a prisoner of war over there, and I'd like to take another look at the places I passed through while I was in the hands of the enemy. That is true, particularly of Athens. I bailed out over Greece, but you can't see much while dangling and tossing from a parachute. I like the people there and I certainly want to go back again some day."



Lt. Irving Kaufman, Base S-4, Hawaii: "Very much so. I'd like to show my wife the pineapple patch where I was assigned. And I'd like her to see some of the best climate in the whole world. Hawaii is really a great place—very beautiful, even when seen under the disadvantage of war conditions. Some of the beaches on the northern shore are wonderful, and the interior of the island is something to marvel at. Furthermore, I'd like to get a look at some of the airfields I had a hand at building. No, I never saw a grass-skirt dancer all the time I was there. Do they really have them?"

Sgt. Anthony A. Costantino, photographer, Panama: "No, no, a thousand times no. There is nothing to visit. All they have there is a canal and nothing else, and the weather is much too hot for a vacation. I think that 25 months down there is enough for anybody. The only decent-size city is Colon, and even that is too small for anyone accustomed to living in an American city. The people in Panama are wonderful but their country just isn't for me. For my part, I would just as soon do all of my visiting in the United States. When you leave Ameriea, you appreciate it."

Cpl. Eugene Marcus, clerk, England: "Positively. England is a great country. It is beautiful almost beyond belief in many places. The best part of England, however, is the people. You have heard stories of their courage and strength, and everything you heard is absolutely true. I'll bet that every soldier who has been there will share my opinion about the English people. I know a lot of fellows didn't like the climate very much but it is just a question of getting accustomed to it. The beautiful countrysides of England just cannot be matched any place in the world. I expect to go back."

Pvt. Edwin Garner, cook, England: "No, I don't want to return to England. I'm tired of it. That climate! Fogs and rain all the time. When we saw those big barrage balloons, we wondered why they didn't cut them loose and just let the place sink. I suppose I got the wrong impression of England, however. Seven of my eight months there were spent in a hospital, and there certainly is nothing cheering about waking up and looking at depressing leaden skies day after day. The people were fine, but for my dough give me the good old United States every day in the week."

RENDEZVOUS

(Continued from Page 3)

provide sufficiently cool air. Most of the crew can manage under such conditions, except the radio operator who has the warmest and most uncomfortable position due to additional heat from voltage regulators, radio equipment and so on.

I have discovered if the radio operator opens the top of the plane chute which is located on the floor near his chair on late model Bell-built B-29s, his uncomfortable condition may be relieved somewhat.

Hope the passing on of this information in AIR FORCE Magazine will aid over-heated radio operators.

T/Sgt. E. W. Dunn
346th Bomb. Group (VH)
c/o General Delivery
Herington, Kan.

Technicians in the Wright Field Aircraft Radio Lab tell us that Sergeant Dunn's idea is excellent. The plane chute to which he refers is a special cache for the airplane's flare chute. It is directly behind the navigator.—Ed.

Double-decker Hangars

Dear Editor:

I read with unparalleled interest your article entitled "Sky Flivvers," (AIR FORCE, September, 1945) which gave the future "airplane driver" a broadside view of what to expect in light planes in the welcome postwar world.

The annual financial investment required to operate a private plane far exceeds the amount of money in the average person's pocket. Why couldn't double-decked hangars with elevators similar to garages be built to inerease storage capacity, consequently cutting storage costs practically in half?

A/C Earnest S. Armistead
Tampa Squadron AAFA
Tampa, Fla.

A Winner

Dear Editor:

Would you save me from the intimidation of losing a bet? I say that there is a modified P-39, a two-place job which was intended for use as a transition flight trainer. Remember now—a two-place job (the extra seat being built forward of the regular seat).

Pfc. John I. Mason
Squadron N, Box No. 179
Keesler Field, Miss.

We remember. There is a P-39 modified as a two-place trainer. It is designated PT-39.—Ed.

Answers to "How Sharp Are You"

Photo on Page 2	Questions on Page 33
1. Nine	7. On the beam behind the American officer
2. Four	8. Closed
3. Left	9. True
4. Two	10. No
5. None	
6. Two	

OCCUPATION

(Continued from Page 21)

For those interested in learing the inner secrets of the beauty salon, a cosmetology course is offered at the Ecole Jandeau in Paris. Anyone with musical talent can get two-months' instruction at the world-famous Conservatoire National de Musique in Paris. Air force medical officers who want to tune up for their return to private practice are taking special medical courses at the University of London and the University of Liverpool. Arrangements have been made with British schools for teachers and educators to study the school system and the administrative organization.

The Building Research Station in Watford, England, is offering special courses in architecture, chemistry and engineering as applied to construction and construction materials.

London's Library Association has arranged a refresher course for librarians, while the British Pharmaceutical Society, also in London, has arranged a course that allows students to work in civilian hospitals and pharmacies. Shakespeare can be studied at Stratford-on-Avon. Dramatic activities are offered at London's Central School of Speech Training and Dramatic Arts. Birmingham University has special classes in chemistry and engineering. All phases of architecture are available for study at the London School of Architecture. Some air force men are even working with the Ministry of Public Health and various local government units on projects of municipal architecture and housing, public health administration and city engineering.

Along with the sports and educational programs, plenty of GI and civilian entertainment is constantly on tap. Movies attract about 1,000,000 Army personnel every month. Permanent airfields now being established are equipped with full-size stages so that big shows like "Oklahoma!," "Up in Central Park," and the Radio City Revue will not be handicapped. One AAF outfit has converted a German rifle range into a gigantic indoor theater with dressing rooms and all the trimmings. The emphasis is on large, well-prepared shows that offer real entertainment.

Jive is another big entertainment factor and almost every base has its own orchestra. About 300 bands at various air force bases in the theater are augmented by 14 others which are on continuous tour. The 53 radio stations of the American Forces Network are featuring more and more soldier talent. Air force libraries are stocked with 284,000 books and best sellers are being continually added to the shelves. Librarians report a big increase in readership during the past few months.

But the more that special services provides, the more the men seem to want. Here is a typical list of items requested by an air force station, Germany: 15 radios, 200 basketballs, 150 pairs basketball shoes, 2 gross of ping-pong balls, orchestrations, V-discs, needles, 1 Hill Billy set, 2 bass violins, 1 public address system, 50 athletic supporters, 1 trombone, B-flat. The order was filled promptly. ☆

DEATH MARCH MEDIC

(Continued from Page 13)

over the best part of the barn if their is such a thing as the best part of a barn. They cleaned it out, found straw and spread it out, and laid out the sick. That was our "hospital."

The basic principle of treatment was bed rest. While others stood for hours in cold and rain to get a drink of boiled water or a few potatoes, the sick rested in the straw and whatever rations were available were brought to them. Whenever possible they received extra portions.

For medicines the Germans gave us pittances of important drugs. We had some Red Cross medical parcels which gave us a small supply of bandage, tape, aspirin, lice powder and salves. For hot water-bottles, we heated bricks. For dysentery cases, we made our own charcoal and let the patients chew it and swallow the powder. I had a small supply of sulfa pills which never left my person. These precious pills were doled out only to the most serious cases and those with pneumonia.

Speaking of pneumonias, the technique of listening to a chest was unorthodox since I had no stethoscope. First I would kneel by the patient, expose his chest, scrape off the lice, and then place my ear directly on his chest and listen. After that I would usually remark to the men that if anyone present felt sorry for himself, first let him think of my sad case. After all, at one time I used to have lady patients with chest trouble. This was always good for a laugh and a laugh is good therapy.

In the absence of medications, the sick were dosed freely with pep talks. A sample pep-pill would go like this: "The human body is the toughest device ever built for it is 'fearfully and wonderfully made.' You fellows are young. You are far stronger than you realize. You can take an unbelievable amount of punishment and make a snappy comeback and be as good as ever. Hundreds of men in this column have already done it and you will do it too."

Time will disclose the number of amputations and of deaths. We left our worst sick behind at prison hospitals and never saw them again.

At first the medics did all the work at the barn "hospitals." That was pretty tough on the medics for they marched all day often working during rest periods, and on rest days they walked extra miles to cover sick call for the scattered units of our column. This was improved when airman Bob Merriam volunteered to do all the non-medical work around the hospital. He soon organized a group of helpers headed by Ray Stocker and Shorty Hunzinger. When shovels were available, they dug latrines. They prepared and distributed rations and boiled water. They operated a carrying service from "sick wagon" to "hospital" for those patients with infected feet who could not stand and for those who were too weak to walk. Since many of these fellows also had dysentery, they had to be carried to and from the latrine all night. On several occasions when the Germans could not or would not get us horses to pull the "sick wagon," the non-medics alternated teams of 12 men each to haul the wagon by manpower.

Two other members of the "hospital" staff were the two Sergeants Wagner. Both of these gunners spoke perfect German so they were made the "hospital traders" and they were to secure extra food for the sick. Although we were starving, there was plenty of food in the rural areas we marched through. We had small supplies of coffee, soap, chocolate and cigarettes given to us by the Red Cross and these luxury items were wanted badly by the Germans. The guards were ordered however to shoot anyone trading with German civilians. The trick in black marketing was to trade through a friendly guard or induce him to allow you to contact civilians. The Wagner boys often came back with eggs and bread which they had bartered for coffee and soap. Some frauleins would give anything—and that means anything—for a chocolate bar. All we wanted however was eggs.

On several occasions we received some unexpected help from our flying comrades. The last weeks of the war, Allied planes were frequently attacking the Jerries. Sometimes the strafing attacks would kill horses near us. That was manna from Heaven! Willing gunners cut up those horses fast, and to our hungry columns, no meat ever tasted better than that strafed horse furnished through the courtesy of the "Flying Quartermaster Corps" (P47s, 51s and Hurricanes).

As Allied Forces drew closer, German treatment became better. On May 2, two British sergeants in a recon car reached our column. At this beautiful sight, the Germans began throwing down their arms. One of the sergeants addressed the Germans and us. "For you the war is over," he said This time it was. ☆

Answers to Quiz on Page 45

1. (c) Society of Automotive Engineers
2. (a) True
3. (d) A diagram showing wind strengths and directions in a given area
4. (c) Bombing through overcast
5. (b) General Cannon
6. (a) Shegimitsu
7. (b) Nine—United States, China, the United Kingdom, the Soviet Union, Australia, Canada, France, New Zealand and the Netherlands
8. (b) Nimitz
9. (d) Hiroshima
10. (c) An extremely heavily armed B-17
11. (a) True
12. (b) False. It is a single-engine, pusher-type amphibian
13. (b) A P-51 outfit that operated in northern China
14. (d) Nick
15. (b) 6th
16. (a) True
17. Six
18. (d) B-24
19. (a) General Giles
20. B-32

Seeking Stars

BY LT. EDMOND D. BOLES

AAF Reception Center, Camp Beale, Calif.

ILLUSTRATED BY S/SGT. JOE GREEN

When you scream for more points, remember the guy back of the awards desk is no magician

Time was when ribbons on the chest of a man in khaki signified glory. Ribbons were good for a free drink at any bar, plus a slap on the back and an "I wish I could have been with you." Now with so many men returning from overseas, the fruit salad is sprouting up all over, and the glory just isn't what it used to be.

However, simply because the glory angle is waning, don't think for a minute that all of that chest foliage has lost its value. Never before have ribbons and battle stars been so important. When you see a man getting stoop shouldered from having so many ribbons on his chest and you think he isn't getting all of the glory that he has coming, don't feel sorry for him. That man has medals, medals mean points, and points mean that he will be cashing in the whole works very soon for the increasingly popular civilian attire. Any soldier will trade you all the glory in the world for one more battle star. Number one topic for conversation in the Army today is points. Soldiers talk points, think points and dream points.

I happen to be the awards and decorations officer at the AAF Reception Center, Camp Beale, Calif., and at present I am on the verge of going point mad. Not only do I have my own points to sweat out, but all the other men's points who pass through my station as well. I have had delegated to me the authority to add, subtract, multiply and divide—points. Word has gotten around that I have this almighty power, and as a result, my desk is wet with the tears that are pouring over it daily.

Most squawks are legitimate, and I do my best to see that a man gets everything he has coming to him in the way of awards and decorations. When the war in Europe ended, it would seem that the clerk typists (Military Occupation Specialty 405) in the various organizations, went on a spree and are still incommunicado. At least this is the impression I get when I try to decode some of the records coming back from over there. These men have done their fellow soldiers a grave injustice, since in many cases the individual doesn't know exactly to what he is entitled. It is not uncommon to see a man back from the ETO short three battle stars. The 15 points these three battle stars represent may decide if a man is to become a civilian now or much later. Or 15 points may stop a man from making a long trip to police the Japs. Men back from the Pacific are in even worse straits; many have no stars whatever.

I encountered one extreme case a few days ago in which a sergeant had been dealt a very low blow indeed.

"Sir," he started, "I believe I am short some points on my combat credit."

"How many combat points do you have?" I asked.

"Five, sir," was his answer.

I asked to see his service record and upon examining it carefully I found plenty of major discrepancies. The sergeant had enlisted a few days after Pearl Harbor and had spent 20 months overseas. He had participated in raids for the initial landings in North Africa and had continued to fight throughout the African campaign. He helped soften up Sicily and Salerno. On his last mission he had been shot down, receiving injuries which placed him in an overseas hospital for five months. After a short period in the States he had volunteered for another tour of combat in the ETO. This time he did his fighting out of England. The sergeant participated in the Ardennes campaign, Rhineland and the battle for Central Europe. He had flown a total of 80 combat missions. He held the Distinguished Flying Cross with one Oak Leaf Cluster, the Air Medal with eight Oak Leaf Clusters and the Purple Heart. In a few hours, the sergeant was on his way to separation center on his post. Forty-eight hours later, proudly displaying the discharge emblem, he boarded a bus for his home in central California.

When a man has been shorted battle stars, the system for handing over the accompanying points is fairly simple. From existing records, I learn where the soldier has been, when he was there, and what he did while there. With this information, I check a few now worn charts and find out what went on in his section in the way of battles. I determine if a man is eligible for more battle stars, then have him sign an enlisted man's affidavit or an officer's certification stating that all information is correct. The points are entered on the adjusted service rating card and the man is off for separation center. In no case is a man allowed to sign an affidavit or certification when there may be doubt as to his eligibility. Often a man is so eager for civvies he is willing to sign anything. My desire is to put soldiers in civvies, not in Leavenworth.

Establishing point credit for various medals is somewhat harder. For instance, if a man has been awarded an Air Medal, but he has no orders or record entry to prove it, an affidavit or certification for the award is not enough. A tracer letter must be sent through channels to his former organization asking for more details on the story. If the former outfit is on the ball and answers immediately, the points are entered and the medal is presented.

Not all cases are on the up and up. Sometimes the soldier lets his enthusiasm for points run away with him. A couple of days ago a man came to my desk and demanded that he be given credit for the Battle of the Blue Danube. He had been with a bomb group in Italy and was certain that his outfit had been accorded credit for the battle. I explained patiently that there was no such battle in existence and that if there was such a battle I would be claiming credit for it myself since I too had flown missions out of Italy. Whereupon he proceeded to tell me how we both had been robbed.

Then there was the fellow who came up and calmly asked for six battle stars.

"Why?" I asked.

He seemed surprised, "Because six more stars will give me the necessary points for a discharge."

I thought I would take a look. After all he could be short six stars. Upon looking at his records carefully, I found that all was in order and up to date.

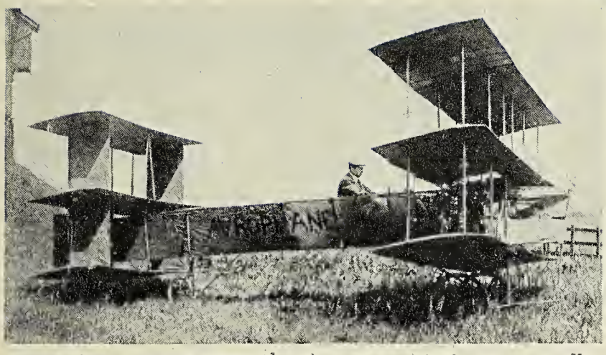
"You're all square, soldier. You have no more stars coming."

"You lieutenants are all alike," he blurted, "never will give a guy a break." He stomped out of the office; I reached for my straitjacket. I do have the authority to give a man what he has coming, but I can't pull points out of a hat when a man has done nothing to deserve them.

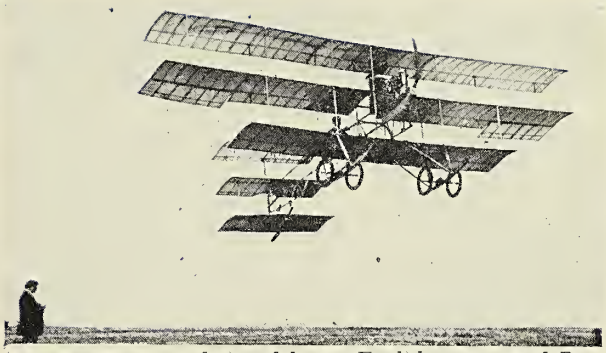
One of the questions the men usually ask after breathing the first sigh of relief (a sigh always follows the addition of points) is, "How about you, lieutenant? When are you getting out?"

They don't know it but they are touching a sore subject. I always reply, "I need two more points to do the trick." Whereupon they shake their heads sympathetically. One fellow asked me why I didn't award myself another battle star. I informed him that I had exhausted all possibilities. But he has a point. Perhaps I am eligible for the Battle of the Blue Danube. I must look into that. ☆

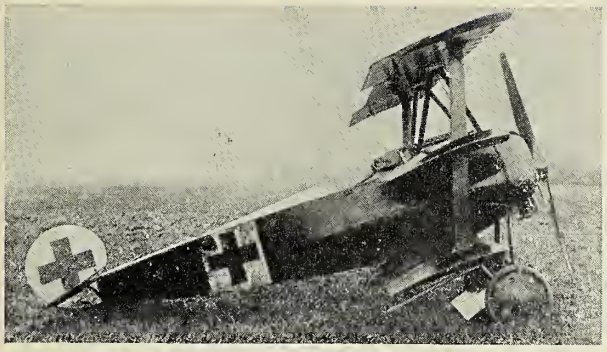
The Album — TRIPLANES



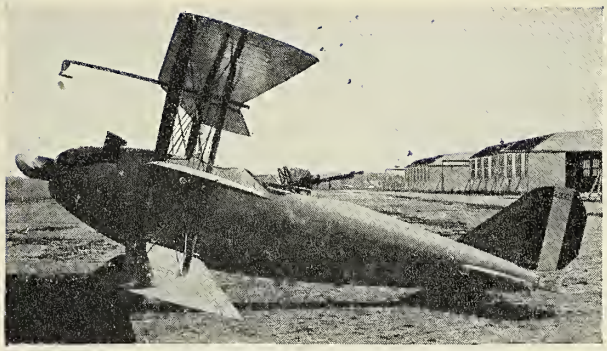
Some time around 1909, the character with the cap actually flew this Avro job which was called, cutely, an Avroplane.



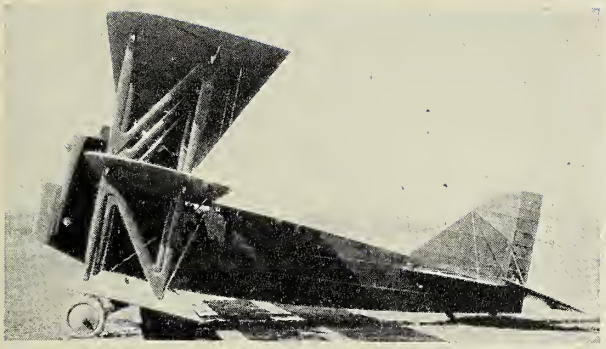
This boxkite was designed by an Englishman named Roe who flew it in Boston in 1910, a biplane he had built crashed.



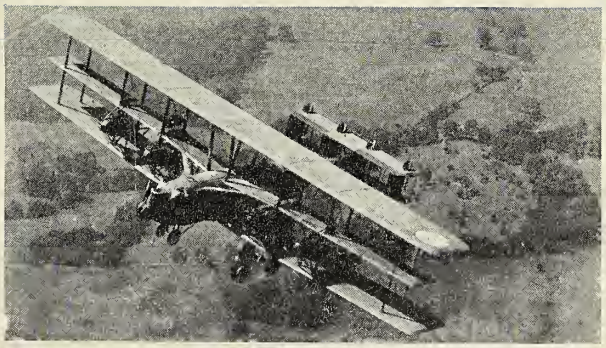
Capt. M. Freiherr von Richthofen, Germany's top ace in the first World War, flew this type of gaily painted Fokker.



In 1918 this streamlined job was the fastest plane in the world. A Curtiss with a Kirkham motor, it would do 162 mph.



This G.A.X. triplane of early twenties appeared to have bumped the end of a hangar. Its two engines turned pusher-type props.



World's biggest airplane in 1923 was Barling Bomber with two pusher and four tractor engines, inboards back to back.

WAR DEPARTMENT
AAF Form No. 54
(Revised 2-18-43)

WAR DEPARTMENT
ARMY AIR FORCES
UNSATISFACTORY REPORT
(See AAF Reg. 15-54 for Information on Proper Use of this Form)

TO BE FILLED IN BY STATION	
STATION SERIAL No.	DATE SUBMITTED
44-326	18 Oct 44

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A. S. C. SERIAL No.	REFER TO	CLASS

STATION	ORGANIZATION
375 APO 557 U.S. Army	Station Engineering (467th Serv. Sq.)

SUBJECT OF REPORT	Property Class—Name	Manufacturer	AAF Order or Shipping No.
	01M Wing Assembly Left & Right	No. American	

—Model & AAF Serial No.	ENGINE—Model & AAF Serial No.	UNIT OR ACCESSORY—Type, Model and Serial No.
O-NA 44-14336	V-1650-7 V-324219	

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DON'T DO THE JOB HALF WAY!

EXPEDITE

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When properly filled out, the Unsatisfactory Report enables the AAF to improve equipment, eliminate malfunctions and to initiate more efficient maintenance, distribution and storing methods.

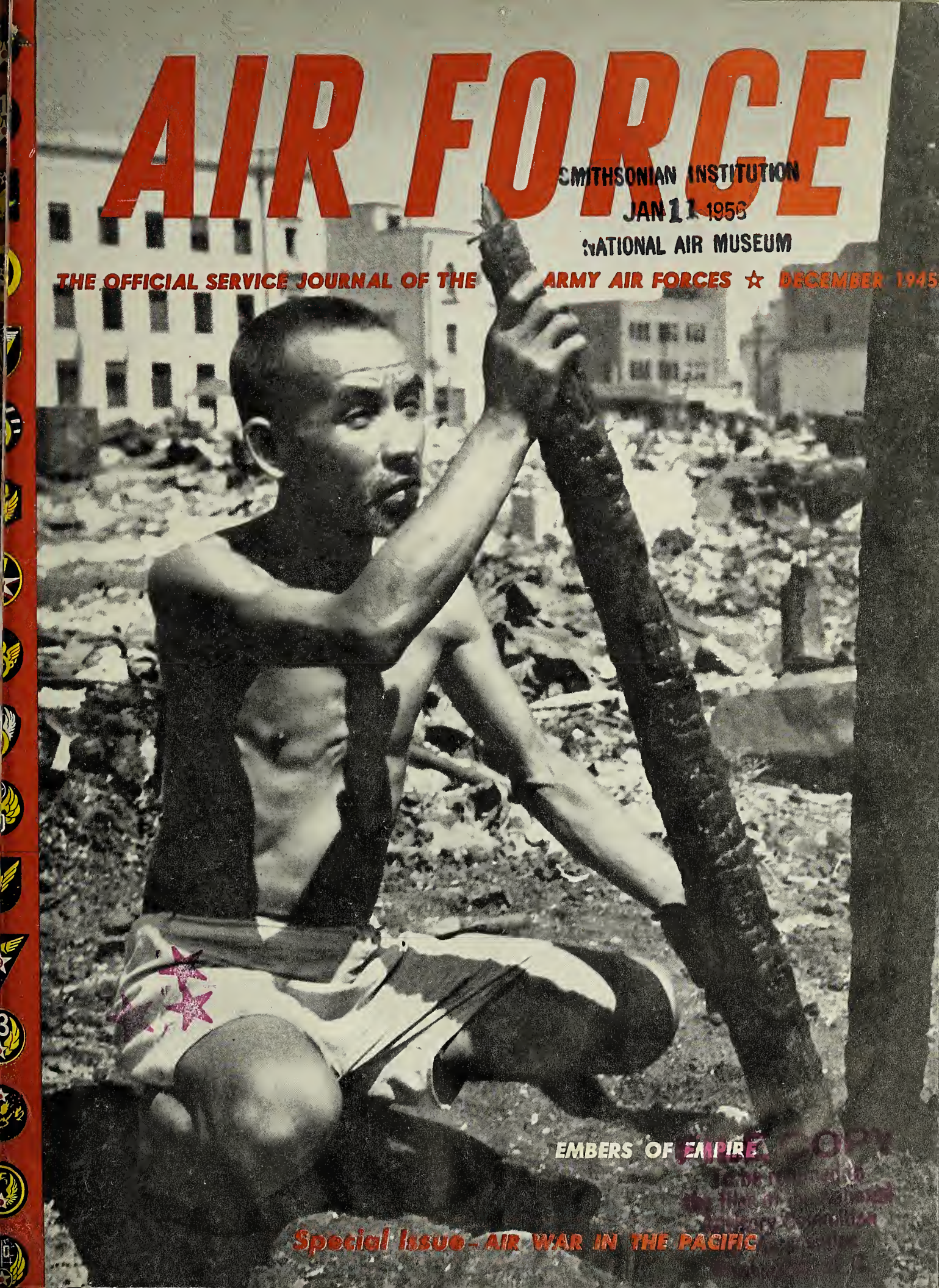
However, an INCOMPLETE UR is as useless as a gun without ammo. When you fill out an Unsatisfactory Report, fill it out COMPLETELY. Every detail is important; nothing is too small to mention. Describe the problem fully, discuss the probable causes and don't pull the punches on your recommendations. The completeness of your report reflects your ability and your interest in the AAF.

If faulty AAF equipment or procedures are discovered—fill out a UR immediately—AND DON'T DO THE JOB HALF WAY!

AIR FORCE

SMITHSONIAN INSTITUTION
JAN 11 1956
NATIONAL AIR MUSEUM

THE OFFICIAL SERVICE JOURNAL OF THE ARMY AIR FORCES ☆ DECEMBER 1945



EMBERS OF EMPIRE

Special Issue - AIR WAR IN THE PACIFIC

ANNOUNCING

The Air Force Association

The newly formed national air organization for the Army Air Forces.

(Aims and purposes do not conflict in any way with established national veterans groups.)

MEMBERSHIP

Open to all honorably discharged personnel — commissioned and enlisted men and women — who have served in or been detailed to the Army Air Forces at any time.

HEADQUARTERS

Established at 1603 K Street, N. W., Washington, D. C., under the supervision of Col. Willis S. Fitch, Executive Director. All inquiries should be made to this address.

Watch for further announcements in this magazine and the press.

Rendezvous

Bettered

Dear Editor:

I have just read with much interest a letter in "Rendezvous" of October, 1945, issue of AIR FORCE. The letter is from Maj. Andrew J. Milstead, Pope Field, Fort Bragg, N. C., in which the Major tells of the 316th Troop Carrier Group returning from the ETO with three Distinguished Unit Citations and nine campaign stars, and is wondering if this record has been topped.

This is to inform the Major that I believe I can top his unit's record. Until quite recently, I was a member of the 98th Bombardment Group (11), whose personnel returned to the States in April, 1945, after 35 months in the ETO, with two Distinguished Unit Citations and fourteen campaign stars. Since the Distinguished Unit Citation has no point value, it looks like the record of the 98th Bombardment Group tops that of the 316th Troop Carrier Group by 20 points.

Capt. Jerome H. Keating,
Hq., Continental Air Forces,
Bolling Field, D. C.

Dear Editor:

. . . My old outfit, the 98th Heavy Bombardment Group in North Africa and MTO (15th Air Force) received three Distinguished Unit Citations and thirteen battle stars. This B-24 group pulled the low-level attack on Ploesti from North Africa. This information is based upon official War Department publications.

Capt. Alfred A. Paradise,
AAF PDC Port Liaison Officer,
Fort Meade, Md.

Wrong Crash

Dear Editor:

On Page 36 of your August, 1945, issue is an article entitled "Plane Luck," in which I am personally interested, particularly the accompanying photograph. From what I've heard and as far as I know, the picture is of myself. I received a jolt on my head when my plane was hit, causing

a lapse of memory for the period of time between 8,500 feet and a hospital five miles from where I crashed.

I've seen the crash in movies (Combat Bulletin No. 37), and I'm quite interested to know where this still picture came from.

Lt. Orin M. Anderson,
Luke Field, Ariz.

Lightning must have struck twice on Min-

(Continued on Page 2)

Vol. 28 No. 12 December 1945

AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

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In This Issue

Appropriately, since this is a special issue on the air war against the forces of Japan, this month's AIR FORCE cover is symbolic of the consequences of Japanese aggression. Though this picture was snapped in Tokyo, our staff correspondents who have visited Japan since the surrender say that this scene is typical of dozens of industrial centers on the islands that were blasted into rubble by our aircraft. In this debris thousands of Japanese men and women who once worked in the belief that they were destined to be masters of a Greater East Asia now poke around in charred embers for what little they can find to keep them alive.

Back of these scenes of desolation is the story of conquest and greed, then retreat and desperation, finally chaos and surrender. Two-thirds of this issue of AIR FORCE is devoted to an important phase of this story—the air phase. In order to provide the maximum possible space for such coverage, it has been necessary to eliminate several of our regular features, but, judging from the number of readers who have expressed interest in a comprehensive review and interpretation of the air war in the Asiatic-Pacific theater, we believe you will agree that their omission is worthwhile.

Actually, AIR FORCE has been gathering material for this issue direct from the theater, from its own correspondents and other sources, for more than two years. At the time of the Japanese surrender, two of our Pacific staff members—Maj. Ben J. Grant, chief of our Far East office in Manila, and Maj. Robert V. Guelich, covering the activities of our B-29 outfits in the Marianas—were assigned to head the project of rounding all this and other material into a single package.

While Majors Grant and Guelich were seeking out interviews, reports and other pertinent data in the Philippines, Guam, Okinawa and Japan, other correspondents were gathering additional information in Asia. Maj. Robert B. Hotz prepared copy on the 14th Air Force; air activities in Burma were covered in manuscripts received from the 10th Air Force historical division. Concentrating on interrogation reports, enemy documents and similar material in the Tokyo area was Lt. Harvey F. Yorke of the AIR FORCE Far East staff.

The basic pattern of the coverage was set up and most of the content of the issue drafted in Manila and Tokyo before Majors Grant and Guelich set out by plane for the States in late October, armed with so much paper that they nearly exceeded the 65-pound baggage limit.

The story told in these pages is not intended as the gloating of a victor. It is a sincere, objective effort to fit many tiny pieces of a tremendous real life epoch into a single comprehensive pattern. This is not the whole story; 32 magazine pages could not hold the overwhelming accomplishments of almost four years of fighting. The stories of single AAF units—even some AAF individuals — would require volumes to cover in their entirety. Nor can we possibly give credit to every unit and every individual who deserves credit in the air victory over Japan. Most of the men in the AAF who fought against the forces of Japan never had an opportunity to see more than one small part of the war, or to understand what an airdrome construction project in China had to do with the landing of General MacArthur's forces on Luzon. If this issue helps the readers of AIR FORCE to understand more clearly how their jobs or their outfits dovetailed into the huge jigsaw of war against the Japanese, its purpose is achieved.

To list the names of officers and enlisted personnel to whom we are grateful for assistance in preparing this special issue would require an entire supplement. From commanding generals right down the line, utmost cooperation was extended our staff members, and because of it our task was made more pleasant and the net product more comprehensive. ☆

VETERANS' ISSUE

In the last few months, AIR FORCE and other AAF offices have received hundreds of questions about civilian job prospects, business opportunities, the economic outlook, housing, farming, insurance and many other subjects of particular concern to men and women about to be separated from the service. With the help of various military and civilian agencies, our staff members have run down many of the answers to these questions and have compiled what amounts to an economic prospectus for the veteran. In order to make this information available to all AAF personnel, AIR FORCE will devote most of its **February issue to** material which provides the answers to questions most frequently asked by AAF separatees.

doro. According to the source, the pilot in this Signal Corps photo is Lt. S. F. Ford of Baltimore, Md.—Ed.

Grandpappy's Record

Dear Editor:

I was very interested in reading a recent account in the October 1945 issue of AIR FORCE regarding the "very honorable discharge" of the B-15 airplane, under the heading "Farewell to Grandpappy." However, I was a little bit surprised that a more complete record was not available in your office regarding several memorable flights of the B-15 on which I was pilot. They are as follows:

Mercy flight to Chile, February 4, 1939—Carrying 3,500 pounds of urgently needed medical supplies to earthquake victims in the vicinity of Santiago, Chile, this flight was more than 11,000 miles round trip. On the return trip, the non-stop flight from Santiago, Chile, to Panama (3,180 miles) was at that time the longest overwater flight on record. For this mercy flight, Major Haynes received the Mackay Trophy Award for 1939, the highest Chilean award—Commander of the Order of Al Merito—and the U. S. Distinguished Flying Cross. The copilot on this flight was Capt. W. D. Old and the navigator, Capt. S. Sanford.

Flight to Mexico City, June 9, 1939—This flight in the XB-15 was for the purpose of returning the body of the celebrated Mexican aviator, Captain Serabia, the "Lindbergh of Mexico," who had flown non-stop from Mexico City to Washington in a small GB plane, but had been killed at Bolling Field when his plane crashed on take-off for his return flight. As a good will gesture, President Roosevelt ordered the body to be flown to Mexico City where it would be received with full military honors. There had been some rumors of sabotage to Captain Serabia's plane and a story which appeared in a Mexican magazine intimated that there might be some reprisal measures taken against the XB-15, as well as Major Haynes. Upon arrival at the airdrome in Mexico City, it was found that a huge crowd of 300,000 persons had gathered and it took considerable time and effort on the part of the Mexican police to clear the crowds sufficiently for Major Haynes to make a landing. There was no evidence of ill-feeling or attempted sabotage, although several persons in the crowd were injured due to their avid curiosity which forced the Mexican police to use rather drastic measures to keep them under control and away from the plane. The good will and appreciation of the Serabia family was evidenced when they presented Major Haynes with a "tigra" (ocelot) which had been delivered from the lowland 120 miles away by runners. The animal is now in the Washington Zoo and has grown considerably since the day in 1939 when he was presented as a cub. The copilots on this flight were Captain Old and Lt. J. B. Montgomery. Lt. Gerald Williams was the navigator.

World's record payload flight, July 30, 1939—This flight broke the existing world's record (Federation Aeronautique Interna-

(Continued on Page 48)

AIR WAR IN THE PACIFIC

BY MAJ. BEN J. GRANT AND MAJ. ROBERT V. GUELICH

AIR FORCE *Staff Correspondents*

AIR WAR IN THE PACIFIC: I INTRODUCTION

Victory over Japan punctuated the primary lesson of World War II—that absolute control of the air by peace-loving nations is essential in avoiding another global conflict

The dramatic suddenness of Japan's surrender left some Americans with the feeling that our Pacific enemy had wriggled out of the war before he was beaten. We know better now. At least we who have seen Japan from the ground know better. Without being invaded, without losing a foot of territory in the homeland, Japan was as surely and as utterly defeated as was her Axis partner in Europe.

Japan's capacity to make war was shattered. Her cities lay in ruins. Her factories were skeletons of twisted steel. Her home islands were isolated. Her air and sea powers were impotent. Her army was demoralized. Her government was ineffectual. Her people were homeless, hungry and afraid.

Japan was a ghost. The surprise is not that she quit when she did, but that she lasted that long.

It is idle to try to name the weapon or the event that persuaded Hirohito to surrender. It was not the atomic bomb or the Russian declaration of war or the B-29 or the blockade. It was the combination of all these and more. It was the attrition of three and a half years of war. It was Japan's progressive loss of the empire without whose resources she could not make war. It was the fall of Germany, which left Japan friendless and alone. It was defeat in the war of production and research. It was the abortion of her original scheme of conquest and the absence of a secondary scheme. . .

It was the whole magnificent Allied show from Guadalcanal, New Guinea, Hawaii, China, Burma and the Aleutians to Tokyo. It was airpower, ground power, seapower and industrial power. It was the L-5 and the B-24. It was the Marines on Iwo Jima, the Infantry at Leyte, the Engineers on Okinawa, the Artillery in Luzon, the Navy at Midway, the Aussies in Borneo, the British in Burma, the Chinese at Hengyang.

It is not too much to say that the Jap's greatest blunder was his misuse and misconception of airpower. When he opened his eyes to the capabilities of aircraft, it was too late. He had lost the battle for air supremacy, and there was no recovering it. We recut the pattern of warfare, and the Japanese never quite got the measure of the new pattern.

So clear was the lesson of airpower in World War II that some of our best military thinkers have become convinced that in another war the side that loses the fight for control of the air will give up, and that will be the end of it. This is not the flight of fancy it may seem. If World War II proved anything at all, it proved that that nation which loses the fight for air control will lose the war. Conversely, it proved that the nation which wins and holds control of the air will, if it exploits that advantage, win the war.

This does not mean that wars will necessarily be decided by temporary or local superiority in the air such as Japan won over us at Pearl Harbor and the Philippines in 1941 and 1942. It means an enduring command of the air, supported by superior research and production and by superior ground and sea power.

One might argue that in the last analysis the outcome of any war will depend upon the power of one combatant or the other to invade and destroy. Perhaps so, but the invasion record in the Southwest Pacific is worthy of examination. During the ship-to-shore phase of 112 landings in that theater between October, 1942, and July, 1945, there were only 235 casualties, a little over two per landing. In 103 of those operations, not a single casualty was suffered in the landing phase. In 107 operations on which complete figures are available, there were only 851 casualties during both the landing phase and the remainder of D-Day up to midnight. In 78, there were no casualties at all on the entire first day.

It is a doctrine as old as warfare that amphibious landings are the most difficult and costly of all offensive operations. Almost none had succeeded prior to World War II. Why, then, were General MacArthur's forces able to make landing after landing with almost negligible losses?

There were many reasons, including the skill and coordination with which the landings were handled, but primarily the answer is found in the application of airpower—before, during and after the landings—in the air blockade of the landing area, in the aerial bombing and strafing of the beach defenses to prepare the way for invasion, in the destruction of the enemy air force in the blockade and landing area, and in the direct air support of the invasion itself. As successful amphibious landings depend upon the application of this air formula, the formula itself depends upon air supremacy. Thus, air control is the first essential element of the power of any combatant to invade and destroy.

This was true all the way up the road to Japan. It would

have been equally true of Operation Olympic, the Kyushu invasion seheduled for November 1, 1945, and of Operation Coronet, the Honshu landing seheduled for March 1, 1946. The invasions of Japan would have differed from the others only in size. They would have been the greatest amphibious shows in history, greater than Normandy. Two thousand B-29s of the 20th and 8th Air Forces, more than 1,000 bombers and fighters of the 5th, 7th and 13th Air Forces, and at least 1,500 Navy planes—more than 4,500 aireraft altogether—would have prepared the way and covered the landing of over 150,000 troops at Kyushu.

Looking baek over the air war against Japan, certain characteristies stand out:

It was a war of movement. Some of our air forees never knew the meaning of a permanent base. When neeessary, complete airbases moved by air. Entire groups moved without losing operational time. One heavy bomb group took off from Port Moresby, bombed Rabaul on the way, and landed at its new base at Dobodura, there to be interrogated by the same intelligenee officer who briefed them a few hours earlier at Moresby.

It was a war of jungle survival. Jungle warfare is tough at best, but we adopted disease control measures and developed disease weapons that greatly redueed the incidence of malaria and other tropieal ills. Aetually, malaria became a potent ally, because Jap control measures were ineffective, and as long as the war lasted their jungle garrisons were plagued by the disease.

It was a war of deception and surprise. The first great applieation of these prineiples of war was the Jap sneak attaek on Pearl Harbor. Later in the war, we turned these elements against the enemy with astonishing regularity.

It was a war of airdromes. Our engineers dropped landing fields into mountain spots aecessible only by air, and then pulled them out again when they had served their purpose. At the other extreme of combat airdrome engineering, Okinawa would have become, if the war had lasted a little longer, the modern marvel of large-seale airfield construetion. As one example of how we won the battle of airdromes, we took over five strips on Okinawa which the Japs had used for about 70 planes eaeh; by making them over, enlarging them, and converting them to double-strip fields, we were able to handle about 400 planes on eaeh one.

It was a war of improvisation. Until the late stages of the campaign, we were handieapped by shortages of nearly everything. In China, having nothing better in the way of ineendiaries, pilots used to drop belly tanks on boats, and a second wave of planes would set them afire with tracers. In India, quiek-disconnect electrieal plugs were fashioned out of carabao horns. Jeeps and trueks have been run on alcohol, pine oil and chareoal. We dropped everything from garbage to beer bottles on Jap troops.

It was a war of tactieal ingenuity. Skip bombing found its most lucrative employment in the Pacific. Masthead and treetop level bombing, developed in the Pacific, beeame the aceepted system for destroying ships and airdromes. The medium bomber developed forward firepower and the fighter grew long legs in the war against Japan. The B-29 laid mines in Jap waters. The Japs could not keep pace with these teehniques. They fought by the book. We rewrote the book or threw it away.

It was a war of researeh, resourees and production. By the end of the war, Jap equipment, category by category, was inferior. His radar was primitive. He did not have a heavy bomber worthy of the name. He was bewildered by our never-ending stream of new weapons and devices—napalm, rockets, proximity fuses, aerial mines, computing sights, the superbomber, the atom bomb. By blockade and recapture, we cut off Jap supplies until, at the end, the nation was unable to provide for barest civilian needs, let alone its war effort.

It was a war of eoordination. Differences arose among individuals and arms of the service. Often we achieved success only in spite of such differences, but we attained a degree of coordination beyond anything we had a right to anticipate. One needs the perspective of time to understand the extent to which eaeh separate stroke against Japan fits into a single pattern.

It was a war of weather. It would be an exaggeration to say that we solved the problem of Pacific weather—mortal man will never do that—but we learned enough about it so that weather was as often our friend as our enemy. With superior equipment and a global reporting network, we were able to fly on days when Japanese airplanes and even the gulls were grounded. We developed equipment whieh permitted us to bomb through the overeast with surprising aecuraey. In July, 1945, 75 pereent of all bomb releases by B-29s were by radar rather than by natural vision.

Although in the final days the Paeific air eampaign aehieved an intensity greater than the peak of the European effort, it was, by comparison, a war of small expenditure. The statisties are eloquent on how much we aeeomplished with the little we had. We dropped three times as many tons of bombs in the European eampaign as in the Asiatic-Paeific campaign. We ran three times as many sorties in Europe and lost twice as many airplanes and more than three times as many men. The AAF overseas strength reached a peak of 627,510 in the European war area, only 467,165 in the vast war area against the Japanese.

It was a war of grim forewarning. After World War I, earnest men talked of outlawing future wars. They thought in terms of proteeting life and property and preventing human suffering. Today, to be realistie, nations must think of war prevention in terms of preserving the very civilization of this earth.

Anyone who has seen the pulverized remains of Hiroshima or Nagasaki knows that this is no idle talk. Yet this was little more than a side-show of World War II. At Hiroshima and Nagasaki, we dropped atomic bombs by conventional means from eonventional aircraft flying at eonventional speed and altitude. Multiply these two bombs and these two eities by any number you will, think of it in relation to other aetual or foreseeable developments in aerial warfare—pilotless aircraft and spaeeeraft, supersonic speeds, greatly increased ranges, radar-controlled or target-seeking missiles, super-bombers capable of carrying 50 tons of bombs, television sights, radar gun sights and turrets, huge airborne roekets, 105 mm nose cannons, these and many others—and you get some idea of what the world might expeet of World War III.

The three and a half years whieh ended last August will live as an heroic period of Ameriean history. It will also live as a hideous period—hideous beeause of suffering and hardship, beeause of its heavy eost in life and property, beeause we eame perilously elose to defeat.

The Jap dared to attaek Pearl Harbor because he knew, as all the world knew, that we were unprepared for war. It is no good now to rebuke ourselves for past blunders, but let us understand what those blunders eost us as a nation and as individuals. And let us not be lulled into those blunders again.

In 1941 and 1942, we were protected by time and distance. In another war, we shall not have sueh proteetion.

Too little, too late was our lesson in World War II. It could have been our epitaph. ☆

DECLINE AND FALL

Jap airpower, so decisive in the war's early stages, tailed off into chaos near the end

When war began the Japanese air force was no youngster. We can't support the Jap claim that in 1901 a native son named Ninomiya built the first heavier-than-air craft to fly, but we do know that the Jap was building experimental planes as early as 1911, and in 1919 laid the foundation of his modern air arm under the guidance of French military aviation instructors.

Before Pearl Harbor, the Jap air force got in some combat time over China, and although the opposition hardly provided a true test of strength, this experience permitted the Jap to refine tactical concepts, just as Germany had done in Spain. As a result, Japan had a better opportunity than the United States to formulate a combat air doctrine and build a combat air force.

By standards which prevailed four years ago, the Jap was a first-rate air power. He went to war with 3,500 combat planes. We had less than half that number fitted for combat and only 600 of them were in the Pacific. His aircraft had been designed and his pilots trained for the particular kind of warfare he forced us into during his initial campaign.

It should have been no surprise that at Pearl Harbor, in the Philippines and in other early attacks, the Japanese air force could strike with skill, precision and overwhelming power. But it was surprising that after this brilliant beginning, the Jap deteriorated so sharply that by the end of 1944 his air force could challenge us only by wasting itself in suicide attacks.

This examination of the decline and fall of Japanese airpower is based on a great variety of source material, including Japanese documents, statements of informed Japanese leaders, and our own observations. Unfortunately, many official enemy documents were burned on August 15, 1945, "in accordance with Japanese custom," but it has been possible to piece together enough information to make an assessment of the principal factors which led to the Jap failure.

To understand these factors is important, not because they make absorbing history, but because in the enemy's mistakes (many of which we ourselves might have committed under less able leadership) there are fundamental lessons for us.

Reasons for the failure of the Jap air force seem to fall under eight broad headings (not necessarily listed in order of importance):

1. Misjudgment on the part of the Jap high command.
2. Basic misconception of the potentialities of airpower.
3. Lack of flexibility in the employment of airpower.
4. Command adherence to the "divine rule" concept.
5. Failure of the Japanese air training program.
6. Defeat in the contest of research and production.
7. Inadequacies of the aircraft maintenance system.
8. Conflict and confusion within and between the Japanese Army and Navy.

The greatest strength of the Japanese air force became its greatest weakness. When war began, the Jap was superbly trained and equipped for his lightning offensive. His airplanes were light, fast, and highly maneuverable. The fighters that attacked the Philippines from bases in Formosa had a range of 1,200 miles, twice the range of our P-40s. They could land on or take off from beaches, corn patches or clipped kunai grass. The Jap thought he could afford to build them that way. He could assume that after his air attacks in the first days of war, our air strength in the Pacific would be all but done for. After that, he would move with little or no opposition.

It had to be that way, for the Jap was geared only to victory. His whole aerial doctrine and mechanism were based on attack. He had built his air force with little thought of defense, because he expected to win before we were able to fight back. That bad guess—or misjudgment—cost him the war.

The Jap had neither the equipment for nor the tactical understanding of the kind of warfare we later compelled him to fight; under attack, his light, fast, high-performance aircraft became flimsy firetraps. Then, his original air plan having been thwarted, he failed to come up with a successful secondary plan. His pilots, having been trained for offensive warfare, often proved incompetent in defense.

After his first few reverses, the Jap lost confidence in the type of air operation he had exploited in the early stages. After that, he rarely had aerial superiority, but even in campaigns like Leyte, where he had overwhelming numerical superiority, he failed to mass his attacks in anything like the strength the job required. Except in the first few months of war, Jap planes rarely undertook anything more than small harassing raids, and when they did attempt a large scale operation they usually suffered fearful losses.

For want of adequate equipment and of confidence in the capacity of his air force, the Jap seldom concentrated bombing attacks on our supply centers and communications lines. Instead, he expended his major effort in medium altitude attacks against non-strategic forward positions. Even as early as the summer and fall of 1942, when the Jap was pressing his drive over the Owen Stanleys toward Port Moresby, his air force made an intensive effort in close support of advancing ground troops, but his offensive strikes

against Moresby itself, which was the center of our defense, were weak and ineffective.

Early in the war, the Army air force was headed by flying men of considerable ability. Later on, when senior air officers became scarce, the high command moved ground men into the top air spots instead of promoting junior flying officers. At the end of the war, there was not a single flying officer in a top air force command. This helps to explain many things, including the Japanese loss of confidence in airpower, the bewilderment caused by each new tactical and technical development in U. S. airpower, and the lack of flexibility and ingenuity in the Japanese employment of aircraft.

The lack of tactical ingenuity was a failing that extended all the way from high command decisions to individual pilot performance. This weakness is bound up with the spiritual background of the Japanese people. Discipline is as much a part of them as is reverence for their Emperor. The military passed its commands down in the sacred name of the Emperor, and these commands no mortal could question. They had to be carried out to the letter, no matter what the consequences. When the plan of conquest was upset at Midway, Coral Sea, Guadalcanal and New Guinea, field commanders found themselves without adequate alternative plans. Until they received countermanding orders from the top, they had no choice but to pursue their last divine directives, and plunge ahead at huge sacrifices of men and material. Commanders had to choose—if you can call it a choice—between the disgrace of disobeying the Emperor, even though they knew him to be wrong, and the disgrace of defeat. They took the latter.

This discouragement of individual initiative is part of the concept of Shintoism. It is the discipline of the Japanese faith. As the intermediate commander does not question the decrees of Tokyo, so the individual does not question the orders of his own commander and, in, turn, is not permitted to use his initiative to meet changing situations. Given a rule book, he follows it. Hundreds of Jap pilots in China, New Guinea and the Philippines were shot down trying to follow rules that were no longer applicable. So long as methods and decisions could be orthodox, the Jap pilot was more than competent. But when he had to fall back on his own ingenuity, he was no match for a resourceful enemy. This "divine rule" concept of command influenced, of course, all phases of the military, but its weaknesses were particularly apparent in the employment of air power, which demands maximum flexibility.

Out of this spiritual background came the enigma of the Kamikaze Corps. In the early days, when it was merely the desperate impulse of a moment that sent a Jap pilot crashing into an Allied ship or airplane, suicide attack was understandable. Occidentals, on a few occasions, did the same thing in this war. But when, at Leyte, we pulled a dead Jap pilot out of his crashed airplane and found him dressed in a green and gold ceremonial gown, indicating that before taking off he had attended his own funeral service, it was almost beyond belief.

The "special attack" was officially incorporated into the Japanese military doctrine at Leyte. Later, during the Okinawa operation, according to the commanding general of the Army air force, General Kawabe, "it became apparent that we would ultimately have to use all planes for special attack."

So the Japs called for Kamikaze volunteers. By the end of the war, about half of the Jap airmen had been accepted for the Kamikaze Corps. Early in 1945, the Japs dropped all pretense of regular combat training, and air cadets were given flight instruction only for special attack. These Kami-

Spectacular Jap phosphorus bomb bursts near Liberators over Truk.

Baka bomb close-up, showing stick, instruments and sighting ring.

kaze schools, which Americans dubbed "finishing schools," gave cadets anywhere from eight to twenty-five hours of flight training, enough to qualify them for Kamikaze duties. The older and better seasoned pilots were withheld for other types of missions.

However, the entire Army and Navy air organizations, veterans and novices alike, were to be hurled against our Kyushu invasion forces in a final desperate Kamikaze effort. Every flyable aircraft was to have been sacrificed if necessary. At that point, the Japs would have had 8,000 to 10,000 planes, less than 2,000 of them operational fighters. One out of four planes would be expected to hit a ship, and as the Jap military figured it, that would have taken out 2,000 ships, enough to thwart the invasion.

There was a lot of wishful thinking in those figures. They made no allowance for counter-defensive measures on our part, for the effectiveness of our ack-ack defenses against obsolete trainers and transports, or for the destruction our 4,500 aircraft would have visited on the 30 airfields from which the Kamikaze attacks were to be launched.

Lieutenant General Tazoe, chief of staff of the Air General Army, asserted with considerable feeling during recent interrogations, "The full air force, led by our commanding general, was made ready to destroy the Allied ships near the shore. We expected annihilation of our entire air force, but we felt that it was our duty."

General Kawabe commented, "We did not have any power to attack by air (with conventional methods). We could only defend the home islands. We expected this special attack defense would bring us to the point where we could win the war."

Such was the pride of the fathers of Kamikaze. To this day, Jap air leaders will correct anyone who refers to special attacks as suicide attacks. As they explain the difference, suicide is taking one's life by one's own volition, while special attacks were made by military order. The fact that all members of the Kamikaze Corps were volunteers does not alter the distinction, as the Japs explain it, because in each case the fatal attack itself was ordered officially and the Kamikaze pilot had nothing to do with the decision.

Yet, Kamikaze was in itself, as General Kawabe admitted, acceptance of the failure of Jap airpower. Early in the war, Japanese training schools turned out high-grade pilots, as U. S. airmen who fought them will attest. Most of them were, as has been observed, lacking in personal initiative, but the blame for that can hardly be laid on the aviation training system. As the war progressed, the manpower shortage became so acute that cadets had to be rushed into combat before they were adequately trained. As another difficulty, the Allied blockade of Japan and the destruction of oil production facilities reduced the aviation gasoline supply below the quantity actually required for combat operations. Full scale flight training was out of the question. That was another situation that led to the complete conversion to Kamikaze training.

Japanese equipment was improved to some extent during the war, but by comparison with U. S. technical advancement, the Jap made a miserable showing. At the end of the war, he had few major items of equipment that were exclusively his own. The baka suicide bomb could have been duplicated easily. His radar was primitive, which partly explains his continuing failure to intercept our attacks effectively. The firepower of his aircraft was stepped up considerably during the war, but it failed to keep pace with ours.

He badly needed a force of heavy bombers, but the development project came to a farcical end. A high Jap officer told the story. It seems that Jap engineers noticed U. S. newspaper pictures which showed the number of men that could stand on the wings of our B-17. It looked like a good wing pressure test, so they applied it to their own experimental model. The wing broke off. They built a stronger wing, and it passed the test. After this triumph, the engineers found only one airstrip in Japan long enough for the plane, and materials, equipment and manpower were lacking to build others. The heavy bomber never went into quantity production.

With information supplied by the Germans, the Japs undertook to develop jet and rocket planes, and at the end of the war they were completing detailed specifications. This was to be the answer to the B-29. The first Jap rocket interceptor crashed, but others were being built with the hope of getting them into combat by the end of the summer of 1945.

Navy experimental work at the time of the surrender was being continued on many carrier-borne fighters, torpedo and dive bombers, long range bombers, wood transports, and a jet-propelled flying wing. The program involved 38 different test-tube planes, but there were few successful models.

The Jap military mind was far from stagnant when it came to ingenuity in use and development of strange weapons. No idea was too fanciful to be given a try. Air-to-air bombing with phosphorous type bombs was used extensively in an effort to break up our bomber formations. Phosphorous rockets also were developed for launching from the Zeke 53 against our air formations. Neither, however, ever

An Oscar turns under two 11th Air Force B-25s, its landing gear dangling as a result of hits scored by gunners of the medium bombers.

approached the effectiveness of our proximity fuse in destroying aircraft.

With their stratosphere balloons, the Japanese were successful in dropping bombs in our northwestern states. Since the missile drifted with the winds, no accuracy could be expected but the expense of sending bombs to the U. S. by free balloons was small enough to permit launching thousands of them. But, again, the method was extremely crude in comparison with the German development of jet and rocket missiles.

All research and development were under military domination. There was no real effort to make use of civilian initiative and experience. Airplane manufacturers were so pressed for production that they had neither the time nor the military sanction to divert any part of their effort to technical developments.

The Army and Navy made demands throughout the war which the aircraft industry was unable to fill. In 1944, the peak year in aircraft production, the industry was good for only 54 percent of the requirement schedule. After the June, 1944, record of 2,857 planes, deliveries fell off as factories began changing over to new planes, and before the slack could be taken up, B-29s started bombing aircraft factories. The Jap tried to disperse his factories, a job that grew increasingly difficult because of transportation troubles and the slow construction of new plants. By July, 1945, production was down to 1,000 planes.

The final effort was to burrow underground. The plan was to increase underground production fast enough to deliver 2,000 planes per month by the summer of 1946. The program fared badly, and at the end of the war the underground production rate had reached only a meager 100 per month.

The bureaucratic cleft between the Army and Navy often hampered the sincere effort of industry and labor to fulfill their commitments. In the huge Mushashina plant of Nakajima, which turned out 38 percent of all Jap aircraft engines, there were two complete production lines, one for the Army and one for the Navy. The fetish of secrecy between the two services was carried to such ridiculous lengths that a high wall was built between the two sections of the plant so that neither could spy on the other.

There was an attempt to remedy this situation following a governmental inspection report that output could be trebled through a coordination of effort. In November, 1943, all aircraft production was placed under the control of the Munitions Ministry, but the Army and Navy nullified the efforts of the Ministry by bludgeoning through their own specifications and requirements.

This was just one of the many evidences of the conflict between the Army and Navy. It was more than the absence of a coordinated effort. It was open hostility. Later, in interrogations at Tokyo, each blamed the other for failure to stop the Allied advance.

Actually, most of their failures were common failures. For example, both services proved incapable of providing their airplanes with repair parts and of supplying needed parts in combat areas. When it became too difficult to move service personnel because of inadequate transportation facilities, service personnel were left behind. This meant that maintenance units often were called upon to repair aircraft, including new models, without any training in their construction or operation. A technical order system theoretically was operated from Headquarters in Japan, but it lagged so far behind that it was of little use in the field.

There were no facilities for engine overhaul or other major repair of aircraft at combat bases, but only at principal air centers far to the rear. It is no wonder that combat units seldom could fly more than 50 percent of their available planes.

From a Nakajima company official, we learned that two-thirds of the aircraft engines produced were ruined or lost before reaching combat. The reasons were poor installation, poor maintenance and ship sinkings.

One of the Jap's greatest weaknesses was his lack of equipment for building airdromes. He could have bought big, modern earth-moving machinery in the States before the war, but this was something he either overlooked or never expected to need. Much of the small equipment he did send into the combat areas was lost at sea. In the words of a Jap major general who had a sense of humor, "We transferred our construction equipment to General MacArthur. What he did not have in New Guinea, he had on the bottom of the ocean."

Short on equipment for more active defense, the Jap carried dispersal to such lengths that he actually lost supplies on his own airfields. At Hollandia and at Clark Air Center, some of the buried items were ferreted out by our mine detectors and latrine diggers. At Mabalacat, near Clark, we found more than 200 Jap aircraft engines, most of them still crated, hidden in shacks, under houses and in alleys.

The Jap was more skillful in camouflage, especially in the use of natural foliage. He hid river boats and coastal barges by turning them into the river banks during daylight hours. He put trees and shrubs over railroad sidings. Some buildings in Tokyo had small forests growing on their roofs. Dummy planes and out-of-commission aircraft made convincing decoys.

Organizationally, the Japanese air establishments were similar to our own Army and Navy air arms. At the top of the command pyramid for both was the Imperial General Headquarters, which corresponded to our Joint Chiefs of Staff. At the next echelon were the War, Navy and Munitions Ministries, which had no direct control over military matters but exercised administrative and procurement functions.

Under Imperial GHQ came the Air General Army Headquarters and six Air Armies, the latter corresponding to our air forces. Each one, except for those defending the homeland, was responsible to the ground Army commander in the theater. There was no command channel from Tokyo air headquarters to the theater air forces until late in the war, when Tokyo assumed the responsibility of directing offensive air strikes, mostly Kamikaze.

Top headquarters for the Navy air force was the Combined Naval Force Headquarters. The air force operated under the Grand Fleet and was divided into six air fleets, each of which was charged with the defense of its assigned ocean area except the 10th in the Tokyo area. That one conducted pilot training and in the last five months of the war was the center of Kamikaze training for the Navy.

In both air organizations, especially the Army's, there was never-ending confusion. Simultaneously, a squadron might receive opposite instructions from its homeland headquarters and from its area Army headquarters. Administrative policies of the War Ministry often conflicted with those of the area army or air headquarters. These difficulties, which persisted through several military reorganizations, told off in inefficiency and indecision.

In interrogations after the capture of Luzon, a Jap squadron commander was asked why the Jap air force never seemed to get hold of itself again after the first series of victories. He seemed surprised that anyone would ask such a question.

"Why, I thought you knew," he said. "It was because of the confusion in our air organization." ☆

JAPANESE TIDAL WAVE

The leap-frogging Jap caught us off balance and shoved us back to the very gates of Australia and India before we could make a stand

In 1942, more than a few responsible men talked gloomily of a 10-year, 15-year or even 20-year war against the Axis powers. A few, shocking as the idea now sounds, frankly doubted that we could ever achieve anything better than a stalemate and a negotiated peace.

For the excellent reason that Germany was the center of the Axis system and its principal military power, we gave the European effort first call on personnel and equipment. In the Pacific, the best we could hope for was enough strength to harass, delay and finally, at a point somewhere short of the Jap goal of empire, hold against the day when we could muster our own offensive.

It was perhaps as well that most Americans never fully realized how close we came to defeat in the Pacific and East Asia. Realism and defeatism in those days were separated by a hair line. Except for the grace of God, the inspiring support of China, and an incredible Allied recovery in New Guinea and the Solomons, the Jap tide might not have been checked.

If December 7, 1941, will, as Franklin D. Roosevelt said, live in infamy, it will also live as the date of one of the most brilliant military performances of all time. Superbly planned and as superbly executed, the surprise attacks on Pearl Harbor, Hickam Field and U. S. bases in the Philippine Islands were successful beyond the Jap's wildest anticipation. In Hawaii, the Jap sank or put out of commission 10 ships, half of them battleships, and damaged three battleships and five other warships; the Army lost 97 planes, the Navy 80. Two-thirds of the U. S. airplanes on the islands were destroyed or damaged beyond repair. In the first two days of war, we lost three-fourths of our Philippines' force of 300 airplanes.

Jap planning and execution in these first attacks bear examination mainly because of their striking contrast to the fumbling, frittering use he made of his air force during the middle and closing stages of the Pacific war. On December 7, 1941, he achieved complete surprise. He struck swiftly, boldly and accurately. He successfully applied the principles of mass attack. By striking again and again, wave after wave, he made full capital of the paralyzing effect of his initial assault. Although his failure to follow through with an invasion of Hawaii deserves criticism, nobody will deny that from the standpoint of air employment alone, his first stroke was masterful.

Until the fall of 1941, the U. S. air striking force in the Philippines consisted of a few outmoded B-10s and B-18s, hardly suitable for combat. In September of that year, the 19th Bombardment Group arrived in the islands and by late November had 25 B-17s. Our aircraft program was being geared for quantity production. The Jap, ever watchful, knew that before long his chance of crippling our defenses in Hawaii and the Philippines would pass. Even as the Jap was bombing Pearl Harbor, B-17s were over Hawaii enroute to the Philippines; they never reached their destination.

The Jap knew that if he could knock us out effectively in the Philippines and Hawaii, then occupy Wake Island promptly, U. S. airpower in the Pacific would be all but neutralized. He knew that if this initial strike were to achieve what he asked of it, our aircraft losses in the Philippines would be irreplaceable. The occupation of Wake would cut the B-17 ferry route from Hawaii. Destruction of Naval forces at Pearl Harbor would prevent transporting pursuit planes to the Philippines by convoy. And finally, the destruction of hangars, depot facilities and aircraft parts at Clark, Nichols and Nielson fields in the Philippines would break down our maintenance system. And since the master plan included the occupation of the rest of the Netherlands East Indies and New Guinea, the route to the Philippines from Australia would soon be pinched off.

How thoroughly the Jap carried this plan through is grim history. Our naval and air strength in the Pacific were badly crippled. Our ground installations at airfields in the Philippines and Hawaii were blasted into uselessness. On December 10, we lost Guam, which might have kept the air route open to the Philippines. Thirteen days later we lost Wake, and the breach was complete.

The Jap, following through with the same swiftness that characterized his whole advance, landed in the Philippines on December 10. The same day, Nichols Field was finished off by a heavy air raid. At Clark Field, we were still trying but everybody knew that the jig was up on Luzon. Five B-17s flew into Clark from San Marcelino that day and took off on individual attacks. One of them, piloted by Capt. Colin P. Kelly, scored hits on a battleship of the Haruna class. This was the most publicized of our few feeble counterblows against the initial Jap attacks.

On Bataan, our fighters challenged the Jap advance, contributing as they could to the ground force effort to delay the inevitable fall of the peninsula. Ingenious mechanics hung bombs on several P-40s, which surprised a Jap convoy in Subic Bay; this was our first fighter-bomber attack of the war.

Our B-17s moved to Australia and Java, then were pushed out of the East Indies. By early 1943 Darwin had become the center of our Pacific air effort. Relatively, but a handful of AAF personnel got out of the Philippines. Bataan was the end of the road for the great majority of the 8,000 in the islands. Most of the AAF men were absorbed by the Infantry, and those who did not fall in the long defense of Bataan became prisoners of the Japs.

The British were faring no better. Twenty-four hours after the Pearl Harbor attack, Singapore, which had been called impregnable, was blasted by Jap bombers. Two days later Jap torpedo planes off Singapore, sank the new British battleship Prince of Wales and the battle cruiser Repulse.

The Jap had us tottering, and he gave us no opportunity to get our balance. He leap-frogged across Asia and the Pacific. On December 18, he occupied strategic Hong Kong and on January 2, 25 days after the outbreak of war, he took Manila. Twelve days later, he overcame Tarakan, one of the last of the Dutch garrisons in Borneo. By January 23, he had occupied Rabaul, later to become the most important single bastion of his whole southern empire; Balikpapan, the great oil center of Dutch Borneo, and Kavieng on the northern tip of New Ireland.

An underrated enemy had gone far in 47 stunning days of war. It is over 3,000 miles—as the crow flies, not as the Jap traveled—from Hong Kong southeast to Rabaul. It is nearly as far directly eastward from Hong Kong to Wake. Singapore, 1,600 miles south-southwest of Hong Kong, was being softened for the blow which would sweep it into the Jap conquest 23 days later. The Jap was proving to a bewildered world that he was a genius of amphibious advance. As we were to do later, improving on the technique he had demonstrated, the Jap spearheaded his assaults with massed air attack, dropped parachutists behind defense lines, isolated his objective, moved in with his amphibious forces, consolidated, sealed off his route and usually managed to keep us guessing where he would strike next.

Unlike our strategy of by-passing strong Jap defense locations on the road back, the Jap took his lightning advance by overpowering all our strong points, island by island. He could afford to do it that way, because he had no opposition worthy of the name. We had only a few underarmed, unescorted B-17s. Australians were flying Wirraway trainers, the Dutch antiquated B-10s.

Although the Aussies knew what they were in for, they tried to intercept the Jap air force at Rabaul, and every Australian plane that went up was shot down. The Dutch B-10s were so vulnerable to air and antiaircraft weapons that sections of steel oil drums and the heavy base plate of electromotors were used as armor to protect the gunners.

More than three months before Pearl Harbor, we had settled on an air war plan which anticipated that we might be at war with Germany and Japan simultaneously. It assumed that Germany would have to be dealt with first, that meanwhile we would be compelled to follow a "strategic defensive" in Asia and the Pacific.

What we did not and could not anticipate was that Japan would catch us so wretchedly unprepared that our "strategic defensive" would take us all the way back to New Guinea and the Solomons and to the very gates of Australia and India before we could make a stand. As events moved in those early days, the term "strategic" rather over-dignified our defensive. Actually, what it amounted to was a desperate and usually unsuccessful effort to slow down the Jap advance. In the early days, our air war plan was of an hour or a minute. We fought on Jap terms.

In China, the Chinese Air Force had been all but eliminated. Maj. Gen. Claire L. Chennault tried to help by establishing a training school for Chinese pilots, but progress was impeded by Jap attacks and shortages of equipment. General Chennault formed the American Volunteer Group to defend the Burma Road, and soon the P-40s of the AVG were in the thick of the struggle against the Jap advance through Burma.

By the end of the first week of March, the Japs had completed their conquest of Malaya, Java and virtually all of the Netherlands East Indies. Singapore was captured by overland advance through jungle swamps, which military men thought impenetrable, foreshadowing the type of fighting we were to face in New Guinea and elsewhere in the Pacific. The Jap had won control of much of New Guinea and was established in the Solomons. The Philippines, where the Allied air strength had been reduced to 20 planes, were isolated and it was only a matter of time until the islands would be completely in Jap hands.

The outlook for Australia was dark. On February 19, Darwin was bombed for the first time by 147 Jap planes. Of 12 intercepting P-40s, 11 were shot down. On March 7, the air defense of Australia consisted of 16 heavy bombers, 16 medium bombers and 136 fighters. The base commander at Darwin was moved to report officially on March 15 that if a Jap attack were made in force, "the Darwin area would be lost within six days." The next day, as if to underline the words, the Jap bombed again.

Chinese soldiers escort four Doolittle flyers to protective shelter of a village near which their B-25 crashed after 1942 attack on Japan.

It was in March that the 49th Fighter Group, the first combat unit to leave the States after Pearl Harbor, made the first U. S. fighter interception of Jap planes over Australian territory. In those days, our flyers were navigating with maps torn out of the geography books of Australian school children. Some borrowed charts from sheepherders.

On March 8, the same day that Lae and Salamaua in New Guinea fell, other Jap forces 4,000 miles away were occupying Rangoon in Burma. Moving on swiftly and easily from there, they cut the Burma Road on April 26, and forced the AVG back into China, which was then cut off from outside aid by land and sea. Chinese and British forces fled from Burma after taking what General Stilwell, their American commander, aptly described as "a hell of a beating."

In the United States, as well as among the Allied forces in Asia and the Pacific, an attitude of defeatism was spreading dangerously. In four months of war, all news had been bad news. The only exception had been the high box scores of the AVG Flying Tigers, and for want of equipment and manpower their successes could not be followed through with anything like a sustained drive. There was little that Allied leaders could do or say to stem the wave of pessimism.

And so, in a stroke which we like to regard as typical of American ingenuity, we contrived to make some good news. On April 18, Lt. Gen. (then Lt. Col.) James H. Doolittle led 16 B-25s in a spectacular raid from the U. S. Carrier Hornet against Tokyo, Yokohama, Nagoya and Kobe. It was a costly undertaking and hardly a successful one by military standards, but it was no discredit to the mission when military men privately termed it a "public relations raid." That was its purpose, and it succeeded admirably. The Allied cause around the world was given new hope and new courage.

Less colorful but infinitely more significant was the good news that followed three weeks later. In his first major setback of the war, the Jap was defeated decisively in the Battle of the Coral Sea where, by air action alone, a convoy headed for Port Moresby was beaten and turned back. U. S. Navy planes shot down 104 Jap aircraft, sank the Jap carrier Shoho, a light cruiser, two destroyers and one aircraft tender. Our carrier Lexington was lost, the carrier Yorktown was damaged, and 55 Allied planes were destroyed. Surface vessels never came in contact. A few Army planes participated in the action.

This battle demonstrated to all the world that airpower would be the determining factor in the Pacific war. And to that extent the Coral Sea was no less important to the land-based air arm of the Army than to the carrier-based air arm of the Navy. It was a convincing preview of things to come.

We learned the hard way at Coral Sea the need for coordination of effort between Army and Navy. In that battle the failure to exchange intelligence information caused B-17s to drop bombs on our own fleet. Our airmen did not know the U. S. fleet was in the area and believed the ships were Japanese. Fortunately, none of our vessels was damaged.

Coral Sea denied to the Jap his most important objective of that moment, but Australia remained dangerously exposed. From Rabaul, the Jap renewed his drive, forcing a two-pronged advance westward along the northern spine of New Guinea and eastward into the Solomons. That gave him a potent triangle, but he still needed Port Moresby and New Caledonia if he was to succeed in breaching our supply line to Australia. He was to try again for Moresby later, taking the relatively safer overland route.

There were other events to temper the public jubilation over Coral Sea. Even as the remnants of the Jap convoy retreated, General Wainwright was surrendering on Corregidor. On the same day, the Japs occupied Hollandia. The enemy conquest of Burma was completed on May 13, and on June 3 landings were made at Attu, Agattu and Kiska in the Aleutians.

Nevertheless, the skies were beginning to clear. Our growing confidence was substantiated in June, when Army and Navy air units repulsed a Jap invasion fleet headed for Midway. A damaging raid on our Midway air defense was accomplished by 150 Jap planes, but 43 of the raiders were destroyed and the Jap fleet was attacked with astonishing success. The Jap lost 50,000 troops, 275 airplanes and 20 ships, including four carriers. Three carriers were destroyed by aircraft, while the fourth, badly crippled by aerial attacks, stayed afloat until a submarine put three torpedos in her side. U. S. losses were the carrier Yorktown, one destroyer and 150 airplanes.

Before the Midway battle, the Jap feinted in the Aleutians, trying to draw our fleet into the North Pacific, and almost succeeded. Just in time, we learned exactly what he was up to, and turned the element of surprise against him.

The relatively small size of the Dutch Harbor striking force made it clear that this operation was subsidiary to the powerful thrust at Midway. U. S. forces in the Alaskan-Aleutian theater were under Navy command and had only 52 vessels and 169 airplanes.

First sighted June 2, the enemy force attack Dutch Harbor and nearby installations June 3 and again June 4. For 48 hours, in weather that was bad even by Aleutian standards, planes of the 11th Air Force pressed a continuous counterattack, aided by naval antiaircraft units and search planes. The Japs were caught by surprise when U. S. bombers and fighters attacked from a secret forward base at Fort Glenn on Umnak Island, 100 miles west of Dutch Harbor. Although fog prevented an accurate count, there was good evidence that the 11th, in addition to shooting down a number of Jap planes, damaged two cruisers. The damage to our ground installations included the loss of 22,000 barrels of fuel oil.

Details of the Jap plan at Dutch Harbor remain obscure, but it is apparent that the attacking forces ran into heavier opposition than they bargained for. While the Jap planes were making their final attacks on ground installations late in the afternoon of June 4, their carriers withdrew, leaving many planes to go down at sea. Our radio picked up the Jap pilots' frantic calls for their missing carriers which, along with other units of the force, had headed for Kiska, Attu and Agattu.

The Jap avalanche was beginning to lose momentum. We were gathering strength, and while we were not yet able to say with assurance that the enemy would be denied his remaining objectives, we were confident that he would no longer be able to move unchallenged.

We were catching our breath after six months of almost frantic training and deployment of airpower. In Burma and China, the AVG was running up a remarkable score against the Jap air force. The 10th Air Force had flown its first heavy bomber strikes against Jap bases in Burma, and had started flying supplies to China over the Himalayan Hump. The 7th Air Force had spread out into South Pacific islands to contest new Jap landings. The 11th Air Force was prepared to take the offensive against Japanese forces in the Aleutians. Australian and 5th Air Force strikes were beginning to jolt the enemy in New Guinea.

We were ready to fight back. Our withdrawal in the Pacific had ended. A new phase had begun. ☆

TURNING THE TIDE

New techniques in use of airpower, born of desperate necessity in New Guinea and China, gave us hope—and a plan for the road back

There was little reason to rejoice in the summer of 1942, but there was abundant cause for hope and courage.

We had improved the prospects of saving Australia and of making that island continent, before many more months, the springboard of a northward offensive. The Jap needed to take or isolate Australia to complete and seal off his southern empire, and was prepared to go to any length to do it. But New Guinea—where in the Battle of the Coral Sea his conquest had been checked for the first time—stood between him and Australia.

The Jap had raised his flag over some of the richest areas on earth. The Asiatic conquest had given him Manchuria, Korea, much of China, Malaya, Burma, Thailand and Indo-China. In the Pacific, he had the Netherlands East Indies, the Philippines and most of the other islands worth taking west of Midway. He had a foothold in the Aleutians and, as he thought at the time, a good chance of completing the capture of New Guinea.

Resources of his sprawling empire were almost endless. He had rubber to burn. He had oil, tin, bauxite, tungsten, nickel, alcohol, quinine and food stuffs, and except as we were able to challenge his shipping arteries from our China bases, he had free access to the sources of all these materials. For the next two years, it was only from China that we could interfere with his major shipping of raw materials, an interference cost him heavily in ships, troops, railway equipment and airplanes.

No doubt the Jap would have been satisfied, so far as empire was concerned, to forget Australia, but he knew that unless he at least neutralized that continent the rest of his empire would be in peril forever. And we knew that if he were to succeed in capturing or surrounding Australia, our offensive could not be launched for years, possibly never.

We were beginning the critical phase that would determine whether Japan's so-called Greater East Asia Co-Prosperity Sphere would come to fruition. The battle for New Guinea would become the seal or the finis of Nippon's bold bid for domination of the Far East.

Now we were able to plan weeks and months ahead. We were thinking in long-range terms of the missions and capabilities of airpower. We settled upon the principles on which we would base the employment of our air force. The record of our adherence to these principles is the story of why our air campaign succeeded. The record of the Jap's violation of them is the story of why the Jap air campaign failed.

From epic Battle of the Bismarck Sea came this photograph showing two 5th Air Force B-25s moving at low level on Jap troop transport.

Here are the basic rules and principles which we set up:

1. Make full use of the elements of surprise, mass and flexibility of force.

2. As the first objective of airpower, neutralize the enemy's air strength.

3. Keep the battlefield isolated.

4. Make the enemy spread his forces thinly.

5. Don't advance ground forces beyond the range of land-based aircraft.

6. Coordinate the effort of all elements of the striking force.

7. Follow through to make full capital of air strikes.

Having thwarted the first Jap thrust at Port Moresby, we faced another immediate threat from the direction of the Solomons. The Jap bases on those islands, now well established, imperiled our defense of Australia, and it was logical, as our next step, to land there and slug it out for control of the islands. It was a daring strike, perhaps as daring as any major operation we were to undertake in the Pacific war. We knew it would be costly, and it was.

On August 7, 1942, Marines landed at Guadalcanal in the first U. S. amphibious operation of the war. The landing was preceded by 56 strikes by B-17s from the New Hebrides. The day before, 15 B-17s had struck Vunakanau, Rabaul, in preparation for the Guadalcanal operation, destroying 75 Jap planes.

Before we were able to get adequate servicing facilities into Henderson Field, which became the center of our Solomons' air effort, the boys used to fill their fuel tanks by bucket brigade, passing five-gallon cans along from hand to hand. Foxholes and dugouts were the best protection they had against Jap warships which shelled the field. When a foxhole wasn't handy, they would lie on their bellies behind logs or in bomb craters.

For any value the islands possessed in and of themselves, they would not have been worth the effort, but strategically they were vital, and military necessity dictated that we hold on at all cost. Finally, in February, 1943, we were able to tell a relieved world that the bloody Solomons campaign had ended in success.

A campaign, no less decisive, was proceeding meanwhile under almost intolerable conditions in the jungles and mountains of New Guinea. The enemy, having failed to reach Port Moresby by the water route, pushed over the Owen Stanleys and, by September 17, 1942, had penetrated to within 20 miles of Port Moresby. AAF personnel at Moresby hastily organized into infantry units for defense of the base. All aircraft were on the alert to evacuate on a moment's notice. However, strengthened by supplies and manpower from the threatened city, the Australian forces were able to counter attack and push the Japs back across the Owen Stanley ridge, thus setting the stage for something new in the employment of airpower.

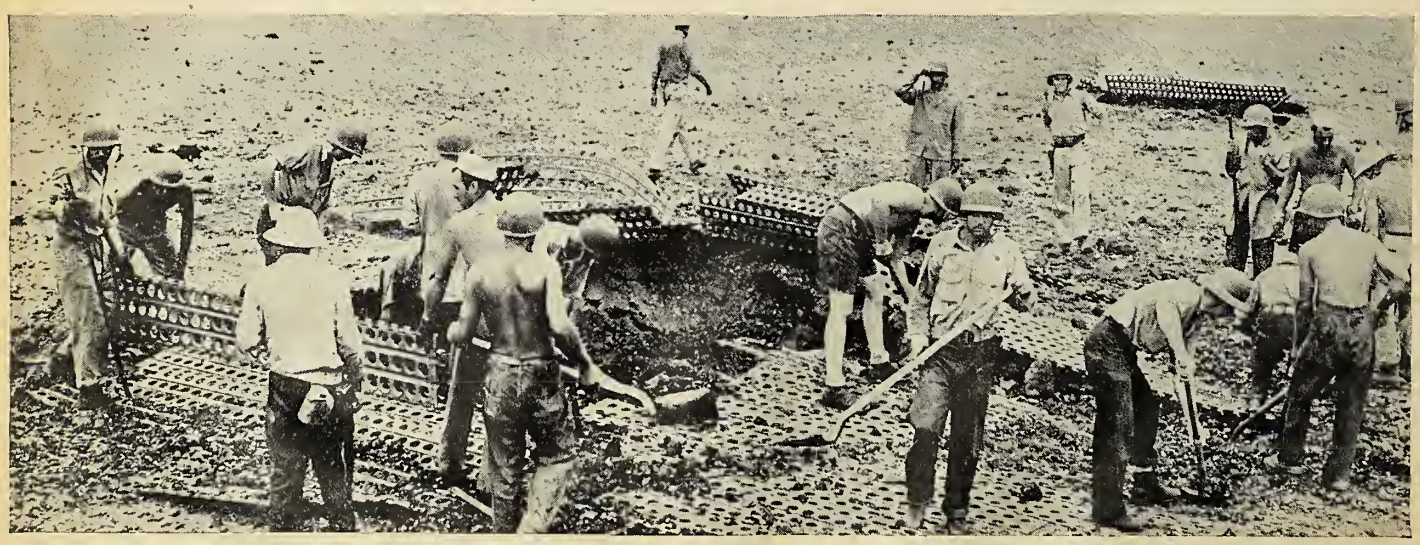
General (then Lt. Gen.) George C. Kenney, who headed both the Allied Air Forces and the U. S. 5th Air Force, told General MacArthur he could reinforce and supply the defenders of the peninsula by air. There was no precedent for an airborne operation of such proportions, but General MacArthur agreed it was worth trying.

However, before our airpower could be brought into full play, it was necessary to recapture the landing field at Kokoda, on the enemy's side of the Owen Stanley Mountains. This was a slow, costly process, and it required six weeks before Allied troops succeeded in driving the Japs back up the jungle track and over the ridge to take Kokoda on November 2. Within two days our engineers, already demonstrating the skill which was to become a major factor in our advance, had the strip ready for use.

A division of U. S. and Australian troops, fully 60 percent of the forces to be involved in our counter-offensive across the peninsula, was flown from Australia to Moresby and thence to the front lines. Complete airdromes and equipment were moved in by air. Trucks, graders and draglines were dismounted and loaded on airplanes. Within the next 10 days we were landing troops and supplies at Wanigela Mission on the Papuan coast, and then the drive for Buna began. Beaufighters and A-20s operated in direct support of the ground troops, strafing and bombing ahead of the advance. By the end of November, the enemy force had been reduced from 13,000 to 4,000. Our flow of airborne supplies and reinforcements continued. One by one, the three remaining pockets of Jap resistance—Buna, Sananda-Soputa and Gona—were overcome.

Papua was one of the great air achievements of all time. If that 110-mile march over the Owen Stanleys had been made on foot, the conventional way of advancing over such terrain, the campaign no doubt would have stretched out for many months.

No less noteworthy than the success of the immediate objective of Papua was the demonstration that campaign offered of flexibility of airpower. To be sure, we had lessons to learn. We didn't yet know how to drop supply bundles accurately. Many went wide, landing in places inaccessible to the ground troops, and some fell into Jap hands. But



Runway mats at Henderson Field, Guadalcanal, required plenty of repairs in the early days as a result of periodic visits by enemy bombers.

we kept trying, learning by doing, and before the campaign was over we were dropping with remarkable accuracy. On one occasion an Australian made a white cross on the ground to indicate the center of the target area, and then stood on the cross to wait. A bundle hit him and killed him.

There was no question after that campaign of the manifold functions which airpower, no matter what the terrain, could serve and serve well. The Jap used the airplane in the Papuan campaign and later campaigns the only way he knew to use it. Conventional employment of airpower has its place, a vital place, but that was not enough. More perhaps than any other single factor, our exploitation of new ways to use airpower was the margin that finally gave us superiority of the air.

The Jap still had notions of consolidating his position in New Guinea and of neutralizing Australia. On December 18, 1942, he occupied Alexishafen, Finschhafen, Madang and Wewak, the latter to become, next to Rabaul, the principal air center of the southern empire. Earlier, the Jap had tried unsuccessfully to establish a landing at Milne Bay, which would have served admirably as a springboard for a flanking attack against Port Moresby.

By January of 1943 it had become apparent to both the Allies and the Japanese that the coming phase of the war would depend in large measure upon the outcome of the battle for domination of the air. Land movements were still. The Jap had us outnumbered in the air. Our hope was to outdo him in ingenuity and employment.

We were doing just that in China. The 14th Air Force, the pioneer in tactical ingenuity, was flying hit-and-run attacks with outstanding success against Hankow, Canton, Hong Kong, Haiphong, Nanchang and Kiukiang, bombing coastal shipping and ports the Japs had thought safe from air attack. The Jap finally had to start diverting planes, guns and troops from other fronts to protect his holdings in China.

Meanwhile, our Pacific air forces were developing new attack techniques, notably low level bombing. It is commonplace today to say that masthead and treetop level bombing became the deciding factor in the 1943 contest for air superiority, so commonplace that few realize the full significance of it. This technique, more than any other single accomplishment, may be said to have enabled airpower to carry the load of the coming campaign to neutralize Jap strongholds in the Pacific for either occupation or by-passing. Its record is one of getting maximum results with minimum expenditure. It was the air achievement that allowed us to make the successful shift from defensive to offensive warfare.

The first major test of the low level attack technique came in early March, 1943, in the Battle of the Bismarck Sea, the most astounding victory of the period. A large Jap convoy transporting reinforcements to the Lae-Salamaua area of New Guinea was attacked by the 5th Air Force and soundly beaten. In one 15-minute period of the three-day battle, 12 B-25s, newly modified by the installation of eight forward-firing .50 caliber guns, sank 10 Jap ships, getting 65 percent direct hits against maneuvering vessels; every B-25 got back safely.

General Kenney messaged that he was so happy he could "blow a fuse."

Bismarck Sea caused a great disturbance in Jap naval circles. Two and a half years later, Rear Admiral Toshitane Takata, Deputy Chief of Staff of the Combined Fleet, said the massed low level air attacks in that battle were "the greatest shock" of the war so far as Japanese naval strategy was concerned.

The significance of Bismarck Sea was deeper than the mere demonstration of the effectiveness of low level attack against shipping. It meant that never again would the Jap dare to send a convoy outside his own land-based range and into ours. It proved that the open water defense concept upon which he had relied was no longer adequate.

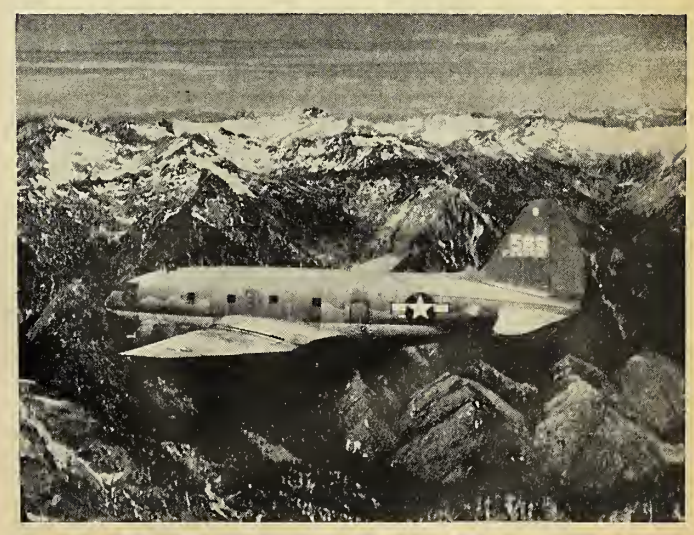
It was apparent that the Jap had extended his perimeter too far. He would be compelled to move his defense line back. His offensive in New Guinea was finished, and his opportunity to take Australia had passed.

As if to double-check his situation, the Jap ran a 100-plane raid against Port Moresby on April 12 and took a beating. The next day, he sent nearly as large a force against Milne Bay and was beaten again. It was another example of the Jap's dissipation of his air strength. He should have learned by then that major air campaigns do not succeed by hitting here today, there tomorrow, without following through and completing the job of destruction. But he didn't learn.

The Jap's static front in Burma and South China also was causing him concern. ATC was flying supplies to China in increasing quantities, and the 14th Air Force was beating back the fringe of Japan's once undisputed aerial superiority over China, while protecting the fragile aerial life line from Jap fighter attacks.

The events of March and April, 1943, dictated a schedule. It was time to start the long road back. ☆

Airmen relax in Aleutians hut before bombing mission over Kiska.



High over The Hump, this C-46 flies vital India-China air route.

ROAD TO JAPAN

How airpower led the way in pushing the Jap back to his home islands and crushing his dreams of empire

If the soundness of our timing for the Allied offensive needed confirmation, the Jap provided it in late April, 1943, when he began the construction of a secondary defense system of 31 airdromes along a semicircle west of New Guinea from Palau through the Halmaheras to Ceram.

The Jap had determined to hold on for dear life to positions which constituted his primary defense line. This was along the northern coast of New Guinea, New Britain and the Admiralties. He would make Wewak, Rabaul and Hollandia the centers of the air system in his lower southwest holdings and would keep them strong at all cost. However, it was apparent that he had abandoned any thought of using his bases in those areas for another major offensive.

Our first job obviously was to neutralize the Jap bases at Wewak, Rabaul and Hollandia, because our offensive would be in jeopardy as long as the Jap maintained his air strength at those strategic locations. Also, it was clear that because of the great concentrations there, we had an opportunity to deliver the Jap air force a blow from which it could never recover.

As a part of our plan of advance, we had concluded that it would not be necessary to go through the tedious and costly process of invading and capturing every island on which the Jap had established himself. We would take only the ones we needed for springboards or for defense or supply bases, bypassing the others and keeping them neutralized by means of a continuing air blockade. So effectively did the 5th, 13th and 7th Air Forces accomplish this neutralization plan that not one bypassed Jap establishment was able to interfere with our advance.

Our offensive opened in May in the Aleutians where American forces, preceded by 11th Air Force bombings of the area, recaptured Attu. Two months later, his supply line having been cut and his positions bombed repeatedly, the Jap gave up Kiska without a struggle. With the Aleutians in U. S. hands again, the 11th Air Force was free to bomb Paramushiro and the Kuriles, which the Jap for a long time afterward had to regard as a possible route for invasion of his homeland. Our operations from the Aleutians throughout the war distracted the Jap's attention from his main effort elsewhere.

In the south, Jap defensive raids were faring badly. On June 14, Allied aircraft shot down 94 of 120 planes attacking our positions at Guadalcanal. On June 21, they shot down 22 of 48 Jap planes raiding Darwin.

An Allied landing at Lae, New Guinea, was scheduled for September, but we knew better than to try it without first reducing the enemy air strength at Wewak, which was building up rapidly. To make a successful attack on Wewak with B-25s, we wanted a staging point for fighter escort. The answer came at Tsili Tsili in the Owen Stanleys, where airborne engineers whittled a strip out of the kunai grass in a spot accessible only by air.

At Wewak on August 17 we employed strafe-bombing attack, the effectiveness of which had been demonstrated at Buna nearly a year earlier. Three squadrons of B-25s from Port Moresby picked up their P-38 escort at Tsili Tsili and proceeded to the target, letting down to treetop level for the approach. They came in line abreast, attacking at a slight angle for better concentration of firepower. Jap planes were lined up alongside the runways. Others were being fueled. Mechanics were working at their stands. On the beach nearby, soldiers were sunning themselves and some were playing medicine ball. AA gunners were pinned down by our blazing 50s. The airdromes were ripe for our parafrags, which floated down all over the runways and parking areas. Photos showed that more than 200 enemy aircraft were destroyed that day. It was easily the most effective single airdrome strafe-bombing attack of the war. Japs who were there still talk about "terrible Wewak."

Having reduced Wewak temporarily, we were ready for the Australians' Lae landing and succeeding operations leading to quick occupation of strategic points in New Guinea. On September 4, the landing took place behind 5th Air Force aircraft, and the operation was completed by September 16. Meanwhile, on September 5, the day after the Lae invasion, paratroopers landed at Nadzab, later to become a major 5th Air Force base for operations against Wewak, Hollandia and Rabaul. On September 11, Salamaua was captured. On October 2, Allied troops captured Finschhafen, closing the Vitiaz Straits.

By October 12, we were ready to attack by air in force

against Rabaul. On that day, in a repetition of the technique used on Wewak airdromes two months earlier, 5th Air Force planes destroyed three Jap destroyers, 46 cargo vessels, 70 harbor craft and 126 airplanes in an attack on the harbor and airdrome. The 5th came back to Rabaul three weeks later, sinking three destroyers and eight merchant ships and destroying 85 enemy aircraft on the ground and in the air. This job took just 12 minutes. Our capture of Green Island on February 15, 1944, virtually ended the air offensive against Rabaul, which thereafter was kept impotent. This was bypassing on a large scale. Ground resistance at Rabaul continued throughout the rest of the war, and in Japan, whenever new civilian sacrifices were called for, the government reminded the people of the stamina their soldiers were showing at Rabaul despite deprivations.

Meanwhile, the Jap had suddenly discovered that the 14th Air Force was making China a major battlefront again. A network of airbases in East China had put our planes in easy range of coastal shipping. Applying low-level skip-bombing tactics, the 14th began the first major campaign against Japan's raw material supply lines. The China Sea had become a battleground in the heart of the Greater East Asia Empire. Merchant vessels were being forced to go farther out to sea where our submarines were waiting for just such targets.

Major Jap air strikes against these forward bases were repulsed. Then the 14th struck its Thanksgiving Day blow at Jap morale by blasting Formosa's principal airdrome with B-25s, P-38s and P-51s. In China, for the first time in many years, an offensive operation was building up so fast that the Jap couldn't stop it without diverting reinforeements and supplies from another critical battleground, New Guinea.

The New Guinea operation was proceeding in jigtime. Taking the northern coast in quick jumps, always covered by land-based aircraft, our forces landed at Cape Gloucester on November 26 and at Saidor on January 2.

The Japs continued to pour airplanes into Wewak, using Hollandia as the main supply base. On February 3, B-24s attacked Boram and Wewak airdromes, leaving them unserviceable. Having received a warning, Jap planes on the two airdromes took to the air, and since they could not return to their own bases, they landed at nearby But and Dagua dromes, just as we expected them to do. When B-25s came in and strafed But and Dagua 80 Jap planes were destroyed. The effectiveness of this Jap network of airfields was finished in mid-March with the destruction of 59 enemy aircraft and the probable destruction of 24 others, but Wewak remained in Jap hands until May 6, 1945.

By the time Wewak was redueed, we had started operating against Hollandia, the third of the great Jap air centers in the area. Taking off from Nadzab, we staged at Gusap, where engineers had built another airdrome in a place accessible only by air. In late March and early April, we virtually finished off Hollandia with attacks which destroyed 300 airplanes and most of the remaining airdrome installations, and on April 22 our forces landed at Hollandia, encountering no air opposition. Our troops got into the Jap airfields so fast they found hot meals on the tables where the fleeing enemy had left them.

Now we had tied a loop around the enemy's 18th Army, dispersed along the coast of New Guinea, and choked off Wewak, Hansa Bay and the Madang-Alexishafen areas. The ultimate fate of New Guinea, and more important, the fate of the Japanese air force had been sealed. The disaster at Wewak had seriously crippled Jap air strength in New Guinea. That at Hollandia had all but finished it.

It was during the Hollandia operation that Capt. (later Major) Richard I. Bong shot down his 27th enemy plane, thus bettering the World War I record of Capt. Eddie Rickenbacker. Major Bong, later killed in a P-80 test flight in the States, had at least 40 victories to his credit by the time he left the theater, and that remained the U. S. fighter-pilot record of the war.

We were moving ahead. From the Gilberts, the 7th Air Force was neutralizing Wotje, Mille, Malcelap and Jaluit. Allied forces had captured Kwajalein, which opened the way to the Marianas. Eniwetok had been taken, thus providing a staging point for 7th Air Force bombers.

The invasion of the Admiralties had been set for April 1, 1944, to be preceded by a heavy aerial bombardment. In February three reconnaissance planes returned from a mission with the news that the Japs had but little strength on the islands. General Kenney recommended that we strike immediately and seize Momote airstrip on Los Negros Island. Additional reconnaissance missions confirmed the initial report, and it was agreed to advance the schedule.

The landing was made on February 29, and the ground troops quickly secured their positions while our aircraft bombed and strafed under the direction of a ground controller. By capitalizing quickly on the findings of aerial reconnaissance, we had effected the operation with minimum difficulty.

By mid-March, the 13th Air Force was able to begin its long bombing campaign against the Jap naval stronghold at Truk, operating from our new airfields in the Admiralties. These raids protected our flank in the advance on the Marianas, the next major objective of our Central Pacific forces.

By now the Jap's primary defense line had been breached at every point, and the secondary defense west of New Guinea was in extreme jeopardy. In July, the Jap started withdrawing airplanes in large numbers from the Halmaheras to the Philippines. Definitely on the defensive, he was establishing a new defense perimeter along a line east of the home islands, east of the Philippines and down through the Celebes, with a second line around the Marianas, which he was desperately afraid of losing.

The Jap also was faring badly in Burma. After a year and a half of shooting up trains and river boats, blasting bridges and military installations in Burma, the 10th Air Force suddenly lashed out in offensive strikes that pushed other campaigns temporarily into the background.

While the 10th pounded the Japanese in Burma, facilities to increase the flow of supplies from India ports to China were built up rapidly. The original depot group of the 10th, which had arrived while the few B-17s evacuated from Java were still operating from India, had spread out to set up service centers from Karachi to Chabua, almost 2,000 miles, to keep ATC cargo ships flying the Hump route. It also was servicing B-24s, B-25s, P-40s, P-38s and P-51s which were flying daily strikes, as well as troop carrier units which were keeping the isolated British-Indian Army in Burma supplied and reinforced.

The struggle of the 10th had won little recognition in its defensive battle to gain time. When our forces finally were augmented and the time came to push the Ledo Road through the northern part of Jap-held Burma, the 10th Air Force not only had cut the Jap supply line to a trickle but also had gained aerial superiority over most of the country.

Rangoon was the Jap's only remaining major supply center, and here enemy fighter strength and antiaircraft were heavily concentrated. This stronghold had to be neutralized. To do the job the 14th Air Force's lone B-24 group was flown to India to join the 10th Air Force's only

group of B-25s. Together, in late November, they blasted rail and port facilities in the largest operation ever flown in Asia except for later B-29 missions.

New long-range fighters flew their first escort over Rangoon, surprising the Japs who never before had seen our fighters so deep in Burma. Then, to finish the destruction, B-25s swept in at medium altitude to saturate Jap defenses. Completing around-the-clock operations, RAF bombers struck at night.

Four strikes by this combined force crippled Rangoon's dock and marshalling yards and the largest railway repair shop in Burma. At the same time, the attack prevented the Jap fighter force from interfering with the simultaneous launching of General Stilwell's offensive.

Two months later, the 10th threw its second surprise blow at the Japs in the first and only use of gliders in the Asiatic theater. Troop carrier planes towed glider-borne Gurkhas and American airdrome construction units deep behind the enemy's front lines. In the midst of the jungle country, our forces built an airstrip from which our fighters harassed the enemy's rear areas.

The isolated task force, fed and supplied by air, managed to divert some Jap troops away from the three-pronged pincers drive of American forces from Assam, Chinese forces from China, and Indian troops struggling through the Arakan hills of western Burma. The campaign through the jungles was long and bitter, but it eventually led to the reopening of the Burma Road.

A final, convulsive thrust by the Japs in March penetrated into India and came within 20 miles of severing the vital Bengal-Assam rail line that carried the bulk of China's supplies from Calcutta to the Hump airbases. British-Indian troops opposed the drive while RAF and 10th Air Force planes strafed and bombed the Japanese until they were forced to retreat.

The battle for Burma was practically won. Ground support strikes for the British drives to Mandalay and Rangoon ended the mission of the 10th Air Force in India. A few days before the war ended, it moved into China to join the 14th Air Force in clearing the Japs from China.

In June, 1944, two developments aimed at a single objective were taking place in areas nearly 3,000 miles apart. In the Chengtu area of China, B-29s were taking off on their first mission against the Japanese home islands. In the Marianas, our forces were invading Saipan, which five months later would become the Pacific base of the B-29s.

Support of the initial assault on Saipan was principally a Navy job, but on D plus 7 our P-47s started landing on the island. They were catapulted from the decks of carriers and flown ashore. Here was close air coordination in the fullest sense of the term. Their missions were so short that at times they were strafing enemy positions within sight of the ground crews back at the airstrips. In one type of operation that delighted the ground men on Saipan, a first wave of P-47s would strafe an antiaircraft emplacement, shooting down the gunners or else driving them to cover; then a second wave would come in unmolested and finish off the target by glide bombing.

While nearby Guam was being overcome, engineers were beginning the major job of building B-29 bases on Saipan for the coming strategic bombing of Japan. The Jap, aware of the use we intended to make of the Marianas, was desperate. His carrier fleet, which had been hiding out since June, 1943, was riding at anchor in the Philippines, where increasing AAF raids led the Jap to believe we would attempt a landing in the summer of 1944. The enemy was caught by surprise when we landed at Saipan instead. His carrier fleet headed for the Marianas. With the carriers keeping out of our range, Jap planes took off from the decks and made for our landing fleet. The plan was for the planes, having accomplished their raids, to land at bases which the Jap still held on the Islands. The carriers would have fled by that time to the safety of Philippine waters.

But Jap cunning was not clicking. We got wise to his plan, and when the carrier planes attacked, 402 of them, nearly the whole force, were shot down. Then our Naval Task Force 58 overtook the retreating carrier fleet and gave it a terrific licking. In the three-day operation, the Jap losses were 428 planes and five ships destroyed, three ships possibly destroyed, 10 or 11 ships damaged. Our losses were 110 planes and superficial damage to two carriers and a battleship.

At that point, the Jap war effort had reached such a sorry state that Premier Hideki Tojo and his cabinet resigned, and General Kuniaki Koiso became premier.

Our advance in the summer and autumn of 1944 exceeded our expectations. The European war was going well, the production of war materials back home had reached a remarkable rate, and supplies were flowing to the Pacific in ever-increasing quantities. On July 23, with the support of 7th Air Force B-25s, our forces had moved into Tinian, the third of the major islands of the Marianas. Four days later, the 5th Air Force struck the first major blow of the war against the Halmaheras. The 7th Air Force opened its 72-day campaign against Iwo Jima. We landed at Peleliu in the Palaus on September 14 and at Morotai, 300 miles from the Philippines, on September 15.

The capture of Morotai brought all of the southern and central Philippines into the range of our heavy bombers. Also, from Morotai we could run daily reconnaissance missions not only into the southern and central Philippines but also to the northeast coast of Borneo. Operations from Morotai could properly be called the first phase of the Pacific air blockade which later was to strangle the home islands into virtual helplessness. When the Jap lost Morotai, he lost his short route from Japan to Java, Sumatra, the Celebes and the Halmaheras. To escape the aerial cover of fire we had laid over that route, his shipping had to go all the way around western Borneo.

The Jap flew some airplanes from the Philippines to the Halmaheras to defend the islands, but it was a feeble effort. In our first mass surprise attack, on July 27, we were intercepted by only 48 aircraft. After that, enemy planes there were no problem.

After his miserable showing in the Halmaheras, the Jap withdrew the remainder of his serviceable aircraft to the Philippines. Because he knew that those islands would be our next major objective, he started concentrating his air and ground strength on Luzon, which he believed to be outside the range of our land-based aircraft. He called in aircraft from the Kuriles, Burma, China, Manchuria and the homeland. By early autumn he had 1,500 planes in the Philippines, and it was apparent that he intended to defend the islands at all cost.

We had bypassed the Celebes after bombing them effectively. It was a severe blow to the Jap when he lost the supply of nickel from that source—we did not know how serious until after the war when Jap military men disclosed that nickel had become one of their most critical shortages.

During this period, the Jap was shocked by a remarkable bombing campaign of the 13th Air Force, joined by units of the 5th, against Balikpapan, one of his principal sources of oil. The first two 2,600-mile missions, September 30 and October 3, were made without fighter escort. After the second mission, although bombing results had been good,

we realized that we had to contrive somehow to provide escort. Enemy aircraft had destroyed or damaged 37 of 100 B-24s in the two raids.

We rigged up fighters with one 310-gallon tank and one 165-gallon tank, and test flights showed them capable of the 1,600-mile round trip from Morotai to Balikpapan. In the remaining missions of that devastating series of raids on the Borneo oil center the Liberators were escorted by P-38s and P-47s.

The Balikpapan campaign is but one incident in the story of our long-legged fighters. Back in the early days fighter escort was available for only extremely short missions; P-39s, P-40s and even P-38s had to strain to complete three-hour missions. By 1945, our fighters were good for missions of 2,000 miles, staying in the air 10 hours or longer.

Although overshadowed by the string of U. S. victories in the Pacific, the 14th Air Force by this time was approaching its maximum effort.

From the early days of AVG operations, American airpower provided the most tangible support to beleaguered Chinese forces which had been fighting desperate battles with practically no other material help from the Allies.

Although its total air strength never exceeded 500 planes, our air force in China had accomplished its two tasks: (1) it had helped develop the aerial supply line from India and (2) had protected this route over enemy territory from Jap aerial attacks. It had also secured platforms for B-29s and its own bombers and fighters.

These tasks were accomplished with less than half of the personnel and only one-third the supplies normally provided for corresponding air units in other theaters. The 14th Air Force never received more than 15,000 tons of supplies a month, less than the bomb tonnage of a single heavy bomber mission over Europe In the early days our China planes dropped French, Russian and Chinese bombs; trucks and jeeps were run on alcohol, pine oil and charcoal; air and ground crews lived on a diet of water buffalo, fat pork, bean sprouts, rice and tea.

But for all its problems and its necessarily unconventional methods, the small force of General Chennault's airmen had slowly pushed the Japanese back. By early 1944 it had established a base only 350 miles from the South China Sea. From this base, a B-24 Snooper squadron set some of the most amazing records of the war. In six months, these planes sank a ton of Jap shipping for every pound of bombs dropped. One crew alone sank 58,000 tons of cargo vessels and one cruiser. On one mission, two Snoopers sank four merchant ships in the Formosa Straits with twelve 500-pound bombs. The 17,000-ton Italian liner Conte Verde, being used by the Japs, was sunk by a lone Snooper off Shanghai

Fighters of the 14th blanketed Southeast Asia. They were protecting the Hump run, supporting the Chinese Salween River Drive and flying harassing raids into both French Indo-China and North China, at the same time protecting the B-29 airbase in Chengtu. This strain and enforced dissipation of effort, among other things, later cost us our East China bases, but the 14th had held on long enough to support the Philippine invasion by reconnaissance and diversionary raids all the way from Shanghai to French Indo-China and the Philippines themselves.

Aerial Blockade of Japan's Supply Lines

There had been some discussion among our top military and naval leaders about bypassing the Philippines. If the subject ever reached the stage of direct disagreement, the resolution came in the discussion with President Roosevelt at Hawaii in the summer of 1944.

In the original plans for the Philippine operation, we would land at Sarangani Bay in southern Mindanao, then at Misamis in northwestern Mindanao. Leyte landings would be delayed until December. After the successes in the Marianas and in naval strikes in the Philippines, the Philippine Sea and Formosa, the Joint Chiefs of Staff, anxious to speed up the Pacific drive, decided on the bolder route of landing first at Leyte.

Leyte was daring for two reasons: First, the defenses there were relatively heavy; second, the landing area was outside our effective land-based range and well within that of the enemy. The Leyte invasion marked the first time we had departed from the principle of keeping our major landings within land-based air range—and we had a close call, closer than is generally known. As it turned out, nobody can argue with the decision. We held our positions at Leyte, thanks in large part to the Jap's poor use of naval and air power, and as a result we advanced the recapture of the Philippines by at least two months.

Our first difficulty was weather. Rain was twice as heavy as one might reasonably have expected at that season in the Philippines. Land-based fighters were scheduled to arrive October 25, A plus 5, but airdrome sites were muddy and construction of strips moved slowly, so that the first land-based fighters did not land at Tacloban until October 28. Our heavy bombers could not operate from Leyte, because the earth was too soggy to support the mats under heavy loads.

We were covering the best we could from distant bases. The 7th Air Force was operating against the area from Angaur. The 13th was flying in from Morotai and the 5th from Biak, the latter staging through the Palaus.

If the Jap had made good use of his airpower, we might well have been pushed back into the sea. He had us greatly outnumbered. By necessity, we lined up our aircraft along the one runway at Tacloban so close together that if a pilot got into trouble he was likely to take out one or two other planes along with his own. That was the vulnerable position of our Leyte aircraft; yet the Jap, with all his concentration of airpower in the area, failed to knock us out.

To the boys who saw it from the ground at Tacloban, the Jap attacks were terrific. But the fact is that instead of concentrating his great air strength on the best target he had seen since Pearl Harbor, the Jap sent out forces that dwindled from 125 planes to 40 or 50, and those usually were so fiercely attacked by our fighters and AA guns that damage to the airdrome never denied us the use of it for more than a few hours at a time.

In a three-day naval battle that began October 24, our fleet units turned the threat of a major disaster into the greatest naval victory of the war. Two Jap fleets approached Leyte, one through San Bernardino Strait and the other through the Surigao Strait; the latter fleet had been reported two days earlier by a 14th Air Force search plane. A third fleet, far northeast of Luzon, moved southward in a diversionary attempt. Our 7th Fleet engaged the Jap units moving through Surigao Strait and knocked them out. The U. S. 3rd Fleet, our principal force in the area, moved north to intercept the diversionary Jap units north of Luzon. That left our landing force exposed to the big San Bernardino fleet, which moved in on our escort carrier force and put six of its seven escort carriers out of commission.

At this point, only our 7th Fleet was left to protect the American beachhead and ships at Leyte. Then came a great surprise. Instead of pressing its advantage, the big San Bernardino fleet turned tail and fled from the area, apparently unaware of our weakness. By that time the 3rd Fleet had engaged the Jap diversionary force in the north, given it a beating, and headed back towards Leyte.

Balikpapan blazes after attacks by 13th Air Force Liberators.

Their target, an enemy supply dump, smoldering in the background

In this battle, which became known as the Second Battle of the Philippines Sea, the Jap fleet was so severely weakened that it never again became a major threat. Most of the remaining ships were destroyed months later trying to run the blockade to Japan.

It was during the Leyte operation also that Jap suicide air attacks reached major proportions. Up to that time, such tactics had been the result of individual pilot desperation, but now the Jap had established this type of operation as a definite part of his system of defense.

From Leyte, our job was to prevent reinforcement of the Jap forces and to neutralize airfields in the central portion of the islands. As late as December, the Japs were trying to get convoys in to reinforce the losing defense of Leyte. On December 7, a Jap convoy and an American convoy proceeded towards Ormoc simultaneously, one from the north, the other from the south. The 5th Air Force, together with attached Navy and Marine planes, sank the Jap force and the American landing, a flanking move, was made without difficulty. The Japs admitted later that they lost 84,000 men by our air action in their efforts to move troops into Leyte from other Philippine islands and Formosa.

In December, the 5th Air Force started reconnaissance missions from Leyte the whole way across the South China Sea, relieving the hard-pressed 14th Air Force, which finally had been forced for want of fuel to evacuate its East China bases.

On December 15, we landed unopposed at Mindoro, which we needed for airstrips from which to attack Clark, Nichols and Nielson fields prior to the coming Luzon invasion. These strips substituted for fields which we had failed to get into operation at Leyte.

For over a week before the Mindoro landing, heavies and mediums of the 5th Air Force had reached out from Morotai, Palau and Leyte to neutralize fields in the Visayans from which the landing force might be attacked. The 13th Air Force joined in, shifting its attacks gradually northward. Enemy airfields on Luzon were attacked by the Third Fleet. In long range reconnaissance missions from rear bases in China, B-24s of the 14th Air Force and B-29s of the 20th Bomber Command searched the South China Sea. We encountered some resistance as our convoy proceeded toward Mindoro, Jap planes sneaking over the mountains to make attacks which sank two LSTs and damaged the cruiser Nashville.

A dramatic but little publicized incident occurred on December 26 when a Jap naval force moved in to raid and shell our installations on Mindoro. Since U. S. fleet units by that time had withdrawn towards Leyte, our forces were vulnerable. Every available aircraft on Mindoro went up to attack the Jap forces. They fought fiercely to keep the ships out, but the Jap persisted and for seven and a half hours the airdrome was under almost constant attack. The enemy force moved in so close that some of the ships could be seen from the shore. Afterwards, the count showed that Jap losses were two destroyers and three other ships sunk and two cruisers badly damaged. We lost 20 aircraft, and our ground installations were severely damaged by Jap air raids; shellfire from the ships was consistently short, probably because our air attacks damaged their fire control mechanisms.

By the time of the invasion of Luzon at Lingayen Gulf on January 9, the Jap air force had been so reduced that only two planes rose to challenge the landing. Suicide planes attacked our convoy en route to Lingayen, but by the time the troops went ashore, opposition had all but ceased. The AAF and Navy divided the task of direct and indirect support of the landings either by times of day or by map coordinates. From China bases, B-29s flew photo missions over Singapore and the South China Sea to locate the southern Jap attack force. Other B-29s knocked out bases in Formosa. The 14th Air Force flew night and day reconnaissance and attack missions to Camranh Bay and up

these B-25s head for home over the rugged jungle of Bougainville Island.

Camouflaged barge is set aflame by mast-high attackers off Timor.

the China coast to Shanghai. From Saipan and Tinian, B-29s were raiding Japan. The 7th Air Force hit the Bonins. The 13th Air Force attacked shipping and other targets from Morotai.

Throughout the first half of January, the declining rate of sorties by the Jap air force in the Philippines showed the effectiveness of our blockade and neutralization. On January 1, the Jap had 480 operational aircraft on Luzon and 1,191 in the Southwest Pacific. By the end of the month, this strength had been reduced to 34 operational aircraft on Luzon and 529 in the Southwest Pacific.

There were too many Jap airdromes in the Philippines for us to expect to keep all of them neutralized, so we did the next best thing. We destroyed the principal ones, concentrating on Clark Air Center, on which the whole Philippine air force depended for supplies and maintenance. We knew that without Clark the Japs could not operate as an integrated air force.

The good sense of that attack plan was apparent after the capture of Luzon. We found 1,505 Jap planes on Luzon alone, most of them destroyed. Few of the others were serviceable. Some needed only a single part to be flyable again. A typical case was the George we found on one of the airdromes. It was in perfect shape except that the carburetor was worn out, but at Clark Field we found dozens of carburetors buried for storage by the Japs.

We had an old score to settle at Corregidor. We settled it on February 16 when Allied parachute troops and amphibious forces, protected by continuous strafing to keep the Japs' heads down, landed on the memorable "rock" following an aerial campaign which had been in progress since January 23. The landings were virtually unchallenged. In two days, C-47s dropped 1,999 paratroopers and 1,292 bundles of supplies on a target area of little more than one square mile. On February 27, the Japs having lost nearly 9,000 killed, organized resistance on Corregidor ceased. It was appropriate that on the same day General MacArthur reestablished the Commonwealth Government of the Philippines.

If the effectiveness of napalm, our new jellied gasoline incendiary bomb, still needed any confirmation, it was abundantly provided at Ipo Dam in Luzon on May 17. This was air support at its best. A garrison of 3,000 to 4,000 Japs had been cut off between Ipo Dam and Angat River. Holed up in caves, as was his fighting fashion all the way from New Guinea to Okinawa, the Jap was prepared to exact a heavy toll of American lives before giving up their positions. The 5th Air Force, using 200 P-47s, P-38s and P-51s, dropped 350 tons of napalm into the pocket, and as flames seeped into the caves, Japs ran out wildly into the current of ground and strafing fire. Resistance quickly ceased; Ipo Dam was taken three days ahead of schedule.

With the Philippines in our control, we had cut off the whole of the southern empire. Even if the range of his aircraft had permitted it, the Jap had seen enough of our blockade to know that there was no hope of reinforcing his holdings in the Indies. And what frightened him most, we now had our springboard for the final drive on Japan.

From the Philippines, we were able to use our heavies, mediums and fighters in attacks against the major industrial installations on Formosa, where the coastal bombing became so intense that the population was moved to the interior in a mass relocation. Also from the Philippines, we initiated a new phase of the blockade, which by now had choked off the home islands. The end was in sight.

While the drive for the Philippines was in progress, B-29s of the 21st Bomber Command on November 24 had opened their strategic bombing offensive against the Japanese homeland, an offensive that finally was to crush the enemy's industrial capacity. Thus, our knockout blow, the fourth and final phase of the war aginst Japan, proceeded simultaneously with the third phase, the advance and the blockade. (The story of the B-29 offensive against the inner empire, climaxed by the atomic bomb in August, will be told in the following chapter.)

By the time the Marines landed on Iwo Jima February 19, the tiny strategic island had been bombed for 72 consecutive days by 7th Air Force planes based in the Marianas. These attacks served their purpose, which was primarily to keep runways cratered so that the Japs could not use them either for staging raids against our B-29 bases in the Marianas or to thwart the Marine landings at Iwo.

Nobody expected the pre-invasion bombing to make the Marines' task at Iwo Jima an easy one. The Japs were protected by caves, which had to be blasted one by one

Waves of paratroopers descend on northern Luzon in final drive.

This Hollandia debacle finished Jap airpower in New Guinea.

before resistance could be overcome. Our Marines lost heavily; Jap losses were twice as heavy.

Iwo gave us a base for P-51 escort of B-29 missions over Japan. Later, to the surprise of the Japs, Iwo-based 51s ran fighter sweeps over the homeland, directly joining the knockout blow against vital industry and airfields. The island provided a haven for B-29s which got into trouble en route to or returning from missions over Japan, and also became a staging point from which B-29s were able to reach as far as northern Korea, 2,000 miles from their bases in the Marianas.

The principal part of the AAF task in preparation for the Okinawa landing took place in areas far distant from the immediate operation. Over a wide area, elements of the 5th, 7th, 13th and 14th Air Forces were attacking a great variety of targets to prevent reinforcement of Okinawa, which we assumed—quite correctly as it turned out—would be our toughest invasion effort to date.

The 14th Air Force, though chased out of its east China bases long before, had undertaken guerrilla air tactics from six airfields behind enemy lines to continue its attacks against Jap coastal shipping and overland communications, and in April, as the Japs were massing bombers at Shanghai for attacks on our Okinawa invasion fleet, 14th fighters swept in to wipe them out. The Jap did not make a single attack from Shanghai against our Okinawa operation.

The Jap suicide force made a desperate effort at Okinawa, and an impressive one. These attacks cost us 35 ships sunk and 299 damaged. The threat became so serious that B-29s were called upon to help knock out the inner island bases from which suicide planes were being launched.

One can only guess how much faster the Okinawa resistance could have been overcome if maximum air support had been called in. As it was, the battle for Okinawa lasted 82 days. During that time, as many as 400 to 600 enemy aircraft, including many suicide planes, were thrown against the occupying forces in a single day. In the battle for this strategic island, the Japs used every plane they had except those regarded as essential to the later defense of Kyushu and Honshu. It was the enemy's greatest air effort.

What Okinawa meant to us as a base for air operations is obvious. It opened the front gate to the Japanese home islands. It began the final phase of the blockade, because from Okinawa we were able to roam the whole of the Nippon inner empire with whatever aircraft types suited our convenience. This was mastery of the air, final and complete. In those last days, when the Jap air force wouldn't or couldn't come up to resist, the route to Japan was the final "milk run" of the war.

Bulldozer clears parking area for P-51s at Pacific staging base.

The Jap had only a taste of the punishment Okinawa held for him. When the war ended, the yellow mud of Okinawa was being replaced by long hard runways on fields which soon would be lined with a thousand B-29s of Lt. Gen. James H. Doolittle's 8th Air Force. The island was becoming, as someone put it, "the Pacific Grand Central of the Air." Convincing proof is the fact that we used more men to build the Okinawa airfield system than to build all our airfields in France and Germany.

As the Okinawa show developed, we were tying up some loose ends in the south. Balikpapan, which had been given a breather during our operations up the line, was on the list. From early 1945 until the July F-Day, the 13th Air Force plastered the Balikpapan oil center with 3,400 tons of bombs. Eighteen consecutive days of bombing preceded the landings, and 7,000 Jap defenders moved back into the hills. On the night before the Australian forces landed, General Wurtsmith, 13th Air Force Commander, reported to General Kenney that of the 87 pinpoint targets selected for the air campaign, 85 had been knocked out. He added, "We'll get the other two before the landings." They did, and when the Aussies went ashore next day, not one was killed and only 20 were wounded. Later on, when the Australians reached the hills where the Japs were holed up, the going got tough. Close support came from the air again, and the advance continued. It was a repetition of the formula that had been standard since New Guinea.

The China campaign also had reached the final stage. For five weeks, the veteran Chinese-American Wing had supported Chinese ground troops in repulsing a Jap drive to take the 14th's Chihkiang airbase, supply center for the guerrilla airfield system. This success marked virtually the end of the war for the remarkable 14th. The Jap was retreating from the bases he had captured six months earlier, abandoning his last supply route to Malaya. After May, Hump supplies were diverted to Chinese ground troops for the southern offensive, to be coordinated with an American landing which never took place.

Step by step, the blockade of Japan had encircled and choked off the home islands. The operations summaries, the communiques and the newspapers reported "shipping strikes" day after day until the term almost lost its meaning. But what it added up to at the end of the war was that Japan's once mighty fleet of ocean-going merchant ships had been reduced to 600,000 tons, and a good third of that was in repair yards.

In July and August, the Japs didn't dare to send out the remnants of its air force in defense of sea traffic. The Navy had been so decimated that our fleet was able to stand offshore and shell Honshu. B-29s had mined the Inland Sea, vital inter-island artery for shipping.

Not one tanker reached Japan after January 1, 1945. It seems almost ridiculous that in the closing days of the war 40 percent of the Jap's available fuel stocks were in Kyushu, and they could not be moved because the home islands had been cut off, not only from the outside but actually from each other.

It was a matter of time. The emperor had a choice. He could listen to his military advisers, let the war go on, make a stand on the shores of Kyushu, and then watch us finish off what was left of his nation. Or he could listen to his own reason and quit. He chose the latter. ☆

JAP BASES
MAJOR JAP BASES
JAP CONTROL 1942
JAP CONTROL 1943
JAP CONTROL 1944
1° OF LATITUDE =68.883 STATUTE MILES
1° =34.674 Statute Miles
1° =68.883 STATUTE MILES
WAKE TO HAWAII 2,300 STATUTE
980 Statute Miles
661 Stat. Mi.
INTERNATIONAL DATE LINE
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SARAWAK
N. BOR.
Labuan
Balikpapan
Batavia
Soerabaja
Singapore
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Saigon
Cam Ranh Bay
Rangoon
Calcutta
Hainan
Haiphong
Ft. Bayard
Canton
Swatow
Amoy
Hong Kong
Formosa
PESCADORES
Shanghai
Tsingtao
Weihaiwei
Tientsin
Port Arthur
Vladivostok
Nikolaevsk
Irkutsk
TRANS
Chinkai
Maizuru
Kobe
Hiroshima
Sasebo
Nagasaki
KYUSHU
Tokyo
Yokosuka
HONSHU
HOKKAIDO
Ominato
Aomori
KURILE ISLANDS
Paramushiro
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Kamchatka
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Okinawa
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BONIN ISLANDS
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CAROLINE ISLANDS
Truk Islands
Ponape
Kusaie
Morotai
Halmaheras
Ceram
Amboina
Biak
Admiralties
Los Negros
Kavieng
BISMARCK ARCHIPELAGO
New Ireland
New Britain
Rabaul
Hollandia
Wewak
New Guinea
OWEN STANLEY MTS
Lae
Finschhafen
Salamaua
Buna
Port Moresby
PAPUAN PENINSULA
SOLOMON ISLANDS
Bougainville
Buin
New Georgia
Munda
Guadalcanal
SANTA CRUZ
San Cristobal
ISLANDS
Makin
GILBERT
Tarawa
ISLANDS
ELLICE ISLANDS
Funafuti
SOUTH
NEW HEBRIDES
Espiritu Santo
Efaté ISLANDS
New Caledonia
Nouméa
FIJI ISLANDS
Viti Levu
Suva
Darwin
Birdum
Cairns
Alice Springs
AUSTRALIA
Perth
Albany
Adelaide
Melbourne
Brisbane
Sydney
Hobart
Tasmania
NEW ZEALAND
Auckland
North Island
Wellington
South Island

END OF AN EMPIRE

When the Japs had been driven back to their home islands, our Superfortresses delivered the blows that brought them to their knees

Japan could not defend her home islands in a last-ditch suicide stand with any hope of success because we had destroyed her capacity to wage war—destroyed it more completely than we had Germany's. We had paralyzed her industry and shaken civilian morale. Before the atomic bomb, before the Soviet entry into the war, Japan was a vanquished nation.

That the B-29s could be credited with the knock-out punch that ended the war has been emphasized innumerable times by the Japanese leaders themselves during interrogations, by ground inspection of the extent of industrial destruction and by examination of preliminary economic statistics. Japan already was groggy from Superfort attacks when on August 6 one of the dreaded "Hellbirds" dropped the world-shaking atomic bomb that not only wiped out a city but also gave notice to the japs that our 1,000 B-29s now could do the job of 250,000 Superforts. The war was over.

The costly naval and ground battles and the desperate expansion of our own air force's striking power had given the AAF bases from which it could launch its strategic air war against Japan's industrial heart. Once the Superfort bases were secured in the Marianas, the fate of Nippon was sealed.

From the Joint Chiefs of Staff in April, 1944, the 20th Air Force received its assignment: to accomplish ". . . the earliest possible progressive destruction and dislocation of Japanese military, industrial and economic systems and to undermine the morale of the Japanese people to a point where their capacity for war is decisively defeated."

Primary objective during the ensuing months, in accordance with our doctrine that the first job of aerial warfare is to neutralize the enemy's air strength, was destruction of his engine and airframe factories. High altitude precision bombing was the pattern followed. Directly related to aircraft factory targets were the thousands of small home-industry sub-contractors which produced about 25 percent of aircraft engine components and about 55 percent of airframe parts. These were scattered through the urban areas of all industrial centers, so incendiary attacks were directed against them as the most effective way of blanketing the wide areas.

Next came the principal armament and munitions industries that fed the Japanese army, navy and air force. We then immobilized vital parts of the war machine by destroying fuel supplies. And finally, the attacks on Japan's railway system had just begun when the war ended.

In addition to these industrial targets, the Superforts also carried out a vital part of the blockade which isolated the home islands from their sources of raw materials and food. In operation "Starvation," they parachuted more than 12,000 mines into the ports of Korea and North China, the principal harbors of the home islands, and in the Inland Sea—main shipping artery for commerce and the haven for the remnants of the Japanese navy. Thus they helped seal the last gap in the iron ring of isolation that had been welded by the 5th, 13th, 14th, 7th and 11th Air Forces and the Navy.

With these accomplishments, the 20th Air Force had surpassed the expectations of General of the Army Henry H. Arnold when, at the time of the first official announcement of the existence and operation of the B-29s, he declared: "The Superfortress is not going to win the war by itself nor has anyone thought it could do so. It will, however . . . strike at the sources of enemy strength and prepare the way for ultimate decision by our . . . land, sea and air forces."

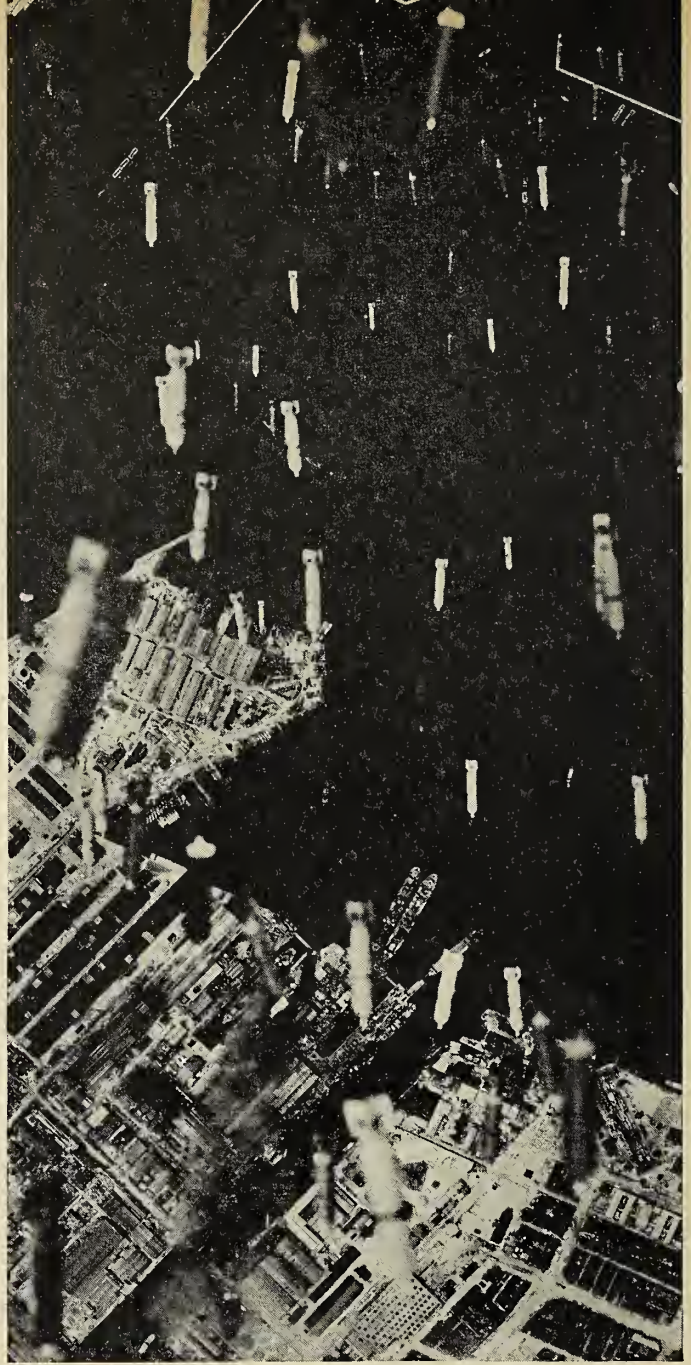
The Superfortress, pride of the AAF, did all this and more, but the road to victory had been a long and tedious one. History books will say little about the men who conceived, modified and produced World War II's most intricate and effective aerial weapon. Yet the midnight oil they burned in laboratories and factories in America was the pilot flame that ignited all of Japan in the conflagration that reduced that nation's economic and social life to ashes.

In 1939, when we still were thinking of military weapons in terms of defense, Major General Arnold as Chief of the Air Corps, with his top staff aeronautical engineers, drew up the general specifications for the longest-range heavy bomber ever conceived. When we were plunged into war two years later, the B-29 was redesigned as the most powerful aerial weapon ever devised for offense. With a central fire control system and electrically controlled remote turrets, 2,200-horsepower engines, refined radar navigation and bombing devices, the B-29 was destined to crush our enemies on their own soil. *(Text cont., page 28)*

Natives build runways at Charra, India, for our Superfortresses.

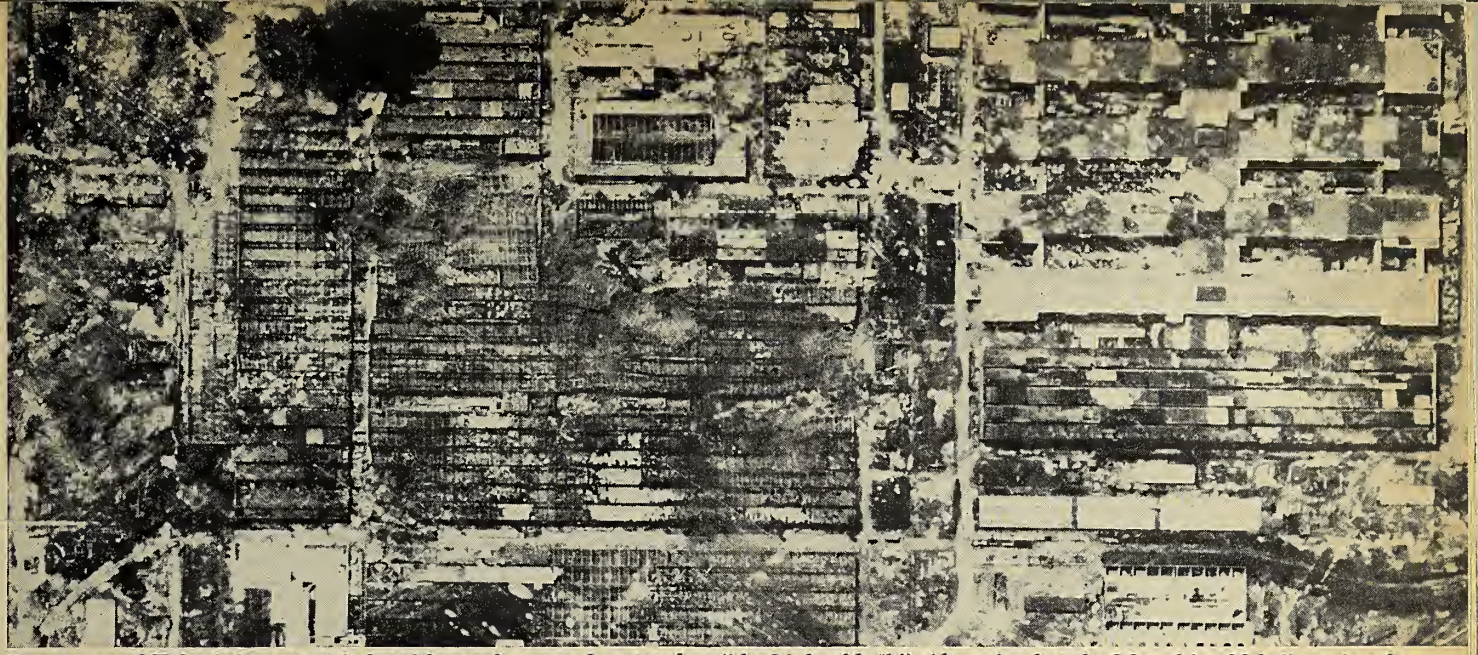
Two-ton bomb falls on a Jap city from B-29 of 58th Bomb Wing.

Industrial city of Toyama, Japan, 90% aflame during B-29 strike.



Firebombs from B-29s rain down on docks and warehouses at Osaka.

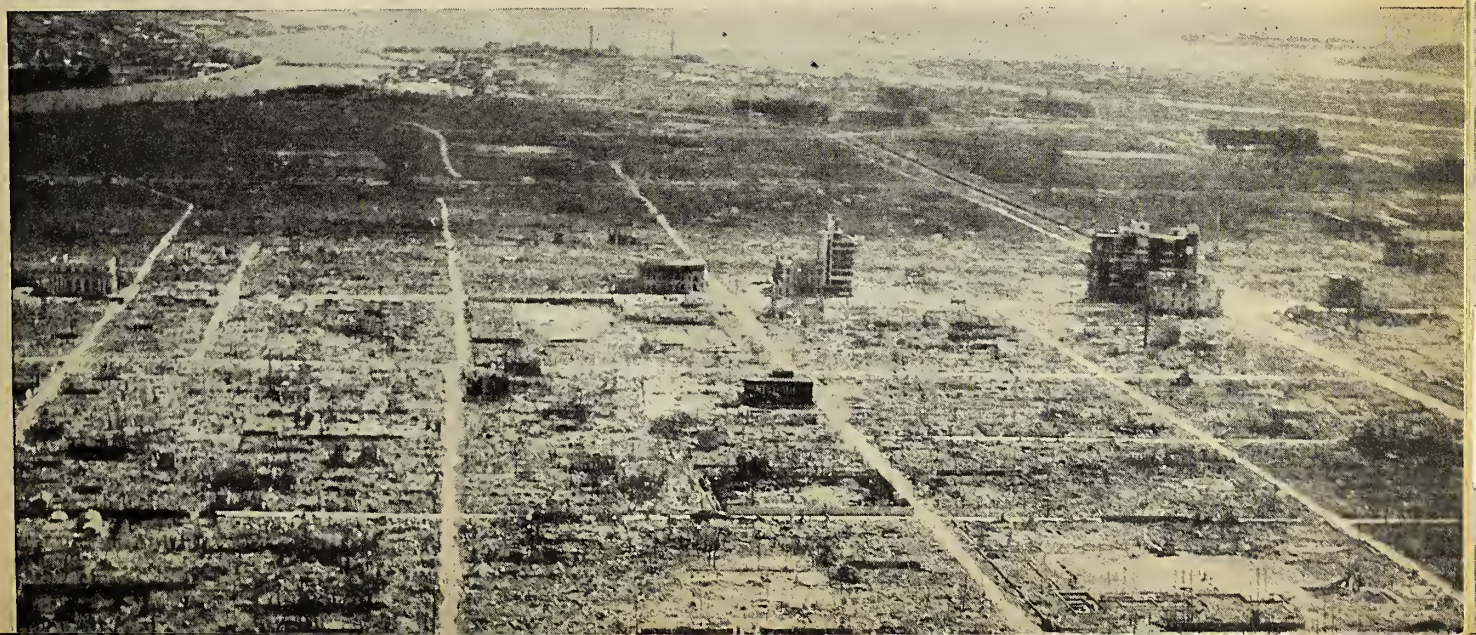
Ground crew on Saipan gives B-29 quick, thorough check-up between attacks during Tokyo "Blitz," when this crew worked night and day.



Vast areas of Tokyo's important industrial complex were devastated by the repeated attacks of the Superforts, called by the Japanese "the birds of hell." Above is what the Musashino Nakajima aircraft engine plant looked like after the B-29 strike of April 7, 1945.

Devastated area above was once the thriving Japanese industrial city of Hamamatsu. Only a few business buildings survived B-29 attacks.

Hiroshima, or what was left of it (below), became known around the world when it was selected as the target for first atomic bomb.



It required two more years of bug-chasing, modification and flight testing before the first B-29 unit destined for combat—58th Very Heavy Bombardment Wing—was activated on June 1, 1943. Then, at the November, 1943, Cairo Conference, the United States promised to put the Superfort into action against the Japanese homeland and Manchuria from bases in beleagured China.

While the greatest mobilization of industrial effort ever concentrated on one weapon was being carried out, ground and flight personnel were being trained in special technical schools, then moulded into integrated battle teams. In January, 1944, maintenance and repair groups were assembled and shipped to India. In April, the first Superfortress landed at its new base in India, followed by the rest of the 58th Wing. In Kansas and Nebraska another Wing, the 73rd, was activated.

In China, hundreds of thousands of coolies rushed the Chengtu airdrome system to completion, breaking rock by hand, packing runways with man-drawn rollers, moving earth in small baskets. Thousand-mile flights to China over the Himalayan Hump kept the crews on their toes as the Superforts hauled their own gasoline, bombs and supplies to advance bases.

On June 6, as thousands of planes and men swarmed over Normandy, the first Superforts took off from India bases on a shakedown mission, attacking marshalling yards in Bangkok, Thailand. Results were poor but the mission proved crews and planes were ready to hit Japan. From China, on June 15, 47 Superforts hit the Yawata Steel Works on Kyushu, dropping the first bombs on the Japanese homeland since the Doolittle raid more than two years earlier. On the same day, we began the invasion of Saipan. The Japanese must have seen that their traditional open-water defense was crumbling.

During the next five months, bombs from B-29s fell in Manchuria, Kyushu, Thailand, Burma, Korea, Formosa, Sumatra, and on Singapore in a record 3,800-mile attack. Superforts reconnaissance sorties, which totalled more than the number of bombing sorties, provided a complete photographic report on all Japanese military and industrial installations from Kyushu and Manchuria to Singapore.

The strain to carry out combat and reconnaissance sorties, requiring 12 ferry trips over the Hump to enable each plane to fly one mission to Japan, limited the effectiveness of the attacks. The average of only one raid every 10 days was an uneconomical use of Superfortresses. But the remaining bugs in the planes were rooted out during these months, and crews gained confidence in their new weapon as they waded through strong Jap fighter opposition. This battle-testing phase was invaluable in the lessons it passed on to the 21st Bomber Command's 73rd Wing, then being readied for attacks from Saipan bases.

In August, Maj. Gen. Curtis E. LeMay, a successful 8th Air Force leader, took over command of the B-29s in India and began learning the capabilities of the Superfortress while smoothing rough edges from performances of aircrews. The human error was too high, limiting the effectiveness of the weapon. The lessons he learned and the policies he adopted were reflected later in the vicious 600-, 700- and 800- plane raids which he directed as commanding general of the 21st Bomber Command from the Marianas.

The 58th Bombardment Wing in India and China was to have been the guinea pig in applying a new strategic concept, the use of Superforts as task forces of the air, flying themselves and their ground crews any place in the world for immediate operation from new bases. But the planes could not use ordinary runways; the quantity of supplies and maintenance equipment needed to keep them operational was too great to be moved by air, and every group of bases required a specialized repair depot. The mobility of base facilities was desirable, but we could not yet rapidly deploy our aerial battlefleets as mobile task forces.

After shelving this globe-hopping principle, the 20th Air Force set its sights on Pacific island bases. Destination of the 73rd Bomb Wing was changed from India to the Marianas, ideal base for Superfort operations against Japan, with the important advantage of a direct supply lane by sea.

With the arrival of the 73rd Wing in Saipan, a new system of maintenance and operation was established. Instead of the conventional practice of locating only one group on an airdrome, an entire wing of four groups was concentrated on each large airbase. Thus, 192 aircraft, 12,000 men and all service organizations of an entire Wing were centralized around one headquarters. This greatly facilitated maintenance and operational control from air force to wing headquarters where all group and squadron personnel were immediately available. Two time-consuming channels were eliminated.

New operational problems, however, proved serious. "Tokyo Rose," first Superfort to fly over Tokyo on a photo-recon mission had confirmed meteorological information that winds as strong as 200 knots per hour would have to be battled—this in addition to fighters and ack-ack. Visual bombing would be the exception, rather than the rule, because of persistent cloud coverage over Japan.

On November 24, Thanksgiving Day in the States, 111 Saipan-based Superforts took off to hit the Mushashina Aircraft Factory near Tokyo in the opening phase of the campaign against the aircraft industry.

On subsequent missions tail winds carried bombers over their targets at 500 miles per hour, far too fast for accurate bombing. To turn back into the wind for another bomb run would have consumed so much gasoline that the planes would not have been able to fly the 1,500 miles back to base. Lack of experience with the fine points of radar navigation and radar bombing also caused many bombs to miss their intended target areas. The climb to 30,000 feet, followed by several hours' operation at this altitude, strained engines to the point that many planes had to turn back because of mechanical troubles. Of the 111 planes that took off on that Thanksgiving Day, 23 aborted before reaching Japan.

In the two months that the 73rd Wing alone operated from the Marianas against Japan, it averaged one mission every six days, only slightly better than the 58th was doing in China. On the first 14 missions, an average of 87 aircraft took off but only 14 percent hit the primary target and 15 percent hit the secondary target. Approximately one-third of the planes were forced to turn back before reaching Japan. The bombing effort was not satisfactory. Weather permitted visual bombing from high altitudes over the industrial Tokyo-Nagoya area on an average of only five days each month. Although enemy air attacks during this period reached their maximum intensity, 984 attacks being made against 64 B-29s over Tokyo on January 27, only half of the plane losses was attributable to enemy action.

Planes were running out of fuel on their return trips and cripples were being shot down by Japanese fighters from Iwo Jima. To neutralize these attacks the Superforts flew two softening missions, dropping more than 700 tons of bombs on the island, and Marianas-based fighters and bombers of the 7th Air Force attacked it steadily until the Marines fought their historic battle to wrest it from the Nips. To win this little island, the Marines lost 4,000 men,

but the sacrifice probably saved the lives of many of the crews of the 2,400 B-29s that later made emergency landings at Iwo on their return from Japan. In addition, the Japs were deprived of the only airbase from which their fighters could attack our formations enroute to and from the Japanese homeland, and our Superdumbos obtained a base from which they could comb the ocean all the way to Tokyo harbor in search of crewmen from ditched Superforts. More than half of the men who went down with their planes at sea were rescued by the Navy in cooperation with these B-29 search planes.

Iwo also provided a base for staging B-29 missions to the northern cities of Honshu, Hokkaido and Korea, and a base for fighters of the 7th Fighter Command to fly escort for their "big friends." These fighters, later incorporated into the 20th Air Force, also flew independent sweeps over Japan and ran up a score of 1,062 enemy aircraft destroyed or damaged at a loss of only 157 of their own planes.

In January and February, 1945, the 313th and 314th Bomb Wings arrived at Tinian and Guam, and General LeMay flew from Calcutta to Saipan to take over the growing 21st Bomber Command.

The pattern of attack from November 24 until March 9, when the Superforts flew their first low-altitude night incendiary attacks against urban areas, was the same for each of the 20 major missions flown against Japan. Sixteen of the strikes were directed against the aircraft industry, three against the urban areas of Tokyo, Nagoya and Kobe. Daylight strikes were scheduled with bombing altitudes first assigned at 30,000 feet, later lowered to 27,000 feet. The high gas consumption required to assemble the large formations and to climb to altitude limited the average bomb load to three tons. At the lower altitudes, Superforts were able to increase their bomb loads to an average of seven tons each before the end of the war.

Difficulties encountered in flying through hurricane winds and bombing through undercast were not the only problems. Japan's still potent fighter force frequently put up 200 to 300 fighter aircraft against our formations of 50 to 75 planes. Although our striking force by the end of February was more than 200 planes, only five missions had been flown during the month—a bombing effort of one-third the potential maximum.

At this point General LeMay evaluated results of the first three months of operations from the Marianas. Although 91 percent of all Japanese aircraft engines were being produced in three plants, making them vulnerable and juicy targets, our aircraft had not yet seriously cut their production. Of 11 high priority targets, none had been destroyed although production had been reduced or temporarily halted for a few weeks. In the three experimental small-scale incendiary attacks from high altitudes, fires were dispersed too widely to be effective. With three wings now available, totaling more than 350 planes, an average of only 130 planes were reaching Japan. A radical change was necessary.

General LeMay's decision was to haul the Superforts down to low altitudes in night raids on urban areas. All ammunition was taken out of the planes to give them more speed and greater bomb-carrying capacity. Instead of mass formations, the planes were to be sent singly over the target. It was a gamble with thousands of men's lives and $200,000,000 worth of airplanes. None knew this better than General LeMay. He was sending his entire strength into the teeth of ack-ack over cities where its concentration was greatest Some said losses would be staggering, but there were many more who believed it could be done.

On March 9, 334 Superforts took off from the Marianas and 279 dropped their incendiaries—1,665 tons—on Tokyo. Fourteen planes were lost and 16 square miles of highly inflammable Tokyo, including many industrial targets, were leveled or gutted by fire. Success of this first fire raid set the stage for devastating all of Japan's major industrial centers and proved that the widely scattered war plants were vulnerable to incendiary attacks.

At the lower altitude, fewer bombers had mechanical trouble, night-fighter interception was negligible, ack-ack was heavy but relatively inaccurate, bomb loads were jumped from 3 to 7½ tons, and weather was so much better that bombardiers were able to drop their sticks visually after the lead formations had hit their targets by radar and lighted up the city with fires. The low altitude mission was not as tiring for the crews, and the effectiveness of their bombing was so satisfactory that their morale skyrocketed. Now they could hit the Japs with crippling instead of merely harassing blows.

After 3½ months of experimentation, the Superforts had found a quick way of destroying Japan. Again and again the principal cities were hit, sometimes by radar at night, sometimes by day, at altitudes from 8,000 feet to 20,000 feet depending upon target defenses. With the vastly improved weather conditions, bombardiers increased their accuracy more than 11 percent over what it had been at higher altitudes. By June 7, following a second intensive fire blitz, productive capacity of the five major industrial cities of Japan had been destroyed. The only large city left untouched throughout the war was Kyoto, historic center of Japanese culture and religion.

The March fire attacks, carried out as part of the overall strategy leading up to landings on Okinawa, temporarily disrupted communication and transportation in the homeland, preventing any rapid redeployment of troops. Then, by Navy request, the Superforts stepped up their schedule to mine Japanese coastal waters.

Their task was to bottle up the Japanese fleet in its home waters so it could not interfere with the large-scale amphibious landings by American forces. The 313th Wing, in the four days prior to the initial Okinawa landings at night, dropped more than 1,000 tons of mines at the entrances to Shimonoseki Straits virtually closing the Inland Sea to all large vessels for 10 days to two weeks. Harassing mines then were dropped in the Kure-Hiroshima harbor areas where the Jap navy was hiding out. Only possible exit was through the Bungo Straits, too deep for mining, and this was in range of our Navy planes. It was no wonder that the Okinawa landings were unopposed by what was left of the Jap fleet.

From April 17 to May 11, the B-29s, at the insistence of the Navy, were diverted from their strategic task to help support the Okinawa operation. Superfort battlefleets made 97 strikes against Kyushu and Shikoku airfields, and, according to General Carl Spaatz, top strategic air commander in the Pacific, "Whereas 500- and 600-plane attacks were flown against Okinawa and vicinity prior to the B-29 attacks on Kyushu airbases, thereafter the enemy was never able to rally more than 50 to 60 for a single attack."

Immediately prior to the suspension of the bombing of urban and industrial targets to carry out the Kyushu attacks, Superforts had begun to cripple seriously Japan's aircraft industry. The two largest engine plants were knocked out. Their production four months earlier had constituted 78 percent of the total output of army and navy aircraft engines. Immediately, airframe plants became top priority targets.

By this time, P-51s had joined the Superforts on their missions, flying escort from Iwo Jima. This protective cover

insured more accurate bombing. On April 27, the Mustangs flew their first independent fighter sweep over Japan. They were navigated to the target and back home again by a "big friend." Their target for the day significantly was Atsugi airdrome where the first American occupation forces were destined to land four months later. They destroyed and damaged 85 Japanese planes and shot up the installation so completely that it still was strewn with wreckage at the end of the war.

In May, the 58th Bombardment Wing had abandoned its bases in India and China to join the consolidated 20th Air Force in the Marianas. It was logical to transfer its units to Tinian where logistical problems already were solved and where an airbase system was ready for them.

The following month the 315th Wing of stripped-down, special radar Superforts moved into Guam to bring the 20th Air Force up to full strength with five wings, which totalled more than 1,000 planes and 83,000 men at the end of the war. The next 1,000 Superforts from the States were destined for Okinawa bases as the main striking force of General Doolittle's redeployed 8th Air Force.

After months of trial and error, and with substantial reinforcements, our big bombers were gathering momentum, and by mid-summer they were as thick as locusts over Japan, bombing day and night with virtually no aerial opposition, losing only four planes to enemy action in the last month of their strategic bombing campaign.

During the final months of the war, mining operations were accelerated to complete the blockade of the home islands. The Far East Air Forces and the Navy had cut off all shipping from territories south of Japan. Submarine and Navy task force sorties knocked out shipping along the east coast and along the fringes of the Sea of Japan. The B-29s then sealed off Korea and North China shipping lanes by mining all principal harbors, an operation that sank or destroyed 1,000,000 tons of shipping.

With their special radar bombing equipment that produced a scope picture 10 times better than that in earlier planes, the Superforts of the 315th Wing completely destroyed the nine principal oil refining and storage plants of Japan in 15 strikes, knocking out 6,055,000 barrels of storage tank capacity. One synthetic oil plant, at Ube, was not merely demolished but it actually was sunk as bombs broke dikes protecting the reclaimed land on which the plant had been built.

This, and all other 315th Wing targets, covered areas less than .6 of a square mile each. Attacks were made at night in single file formation with tail guns as the only armament, yet the wing lost only one plane to the enemy in all its combat missions. By removing the turrets, speed had been increased and bomb loads had been boosted to nine tons. On one mission these planes set a record by dropping 11.4 tons of bombs apiece on the target.

When Japan's largest cities had been destroyed, incendiary attacks were turned to secondary industrial centers. Precision bombing attacks were stepped up with many formations of 50 to 100 B-29s hitting widely separated targets almost every day. It was this plan of striking many different targets in all parts of Honshu simultaneously that completely baffled the remaining enemy fighter force. The Japs didn't have enough planes to intercept more than one or two of our attacking formations, so they quit trying.

By the end of July, opposition was so meager that General LeMay began announcing his targets in advance, warning the Japanese people to evacuate their cities. On July 27, 60,000 pamphlets were dropped on 11 cities announcing their impending doom. Six of the eleven then were attacked the following day. The pamphlets alone, according to Japanese military officials, caused conditions close to panic in some of the forewarned cities, scaring thousands away from their jobs and into the hills.

After hitting the secondary cities with incendiaries, the total score of the war for the B-29s added up to complete destruction of the industrial productive capacity of 58 cities and partial destruction in six others. A total of 178 square miles of urban areas was burned out.

These attacks, combined with the precision bombing strikes, had destroyed the 23 major factories of Japan's aircraft industry, the six main army and navy arsenals, two plants producing tetra-ethyl lead, two major steel plants and the petroleum industry. In addition, 540 other important factories engaged in production of war materials had been wiped out or severely damaged. And to these figures, should be added the thousands of small tool machine shops and assembly plants, the home-industry of the nation, that were levelled.

Material destruction in Japan was almost beyond belief. In many cities there is only wreckage as far as one can see in any direction. Scattered throughout the rubble are small clusters of lathes, drill presses, punches, drop-hammers and other tool machines—remnants of the home industry on which Japan's economy was developed.

It had taken the Superforts 37½ weeks to drop 157,500 tons of bombs on the enemy homeland, but at the end of the war, when for the first time the Superforts were able to fly maximum efforts, the same tonnage was scheduled to have cascaded on Japan in the next 11 weeks, each B-29 carrying at least 7 tons of bombs. These bombs, however, would have been the old-fashioned type. Atomic bombs too would have hit the enemy, if he had not surrendered after the first two wiped out Hiroshima and most of Nagasaki.

More than factories and cities was hit by the bombings. The morale of the people slumped so severely that editorials in the Nippon Times after the surrender attributed much of the responsibility for defeat to the lack of proper spiritual support by the people. Thousands of war plant workers had moved out of the cities to rural areas where they were safe from bombing and then refused to return to their jobs. Fear of many farming people was so great that they rushed to shelter every time an American plane flew overhead. Some Japanese leaders claimed that farm produce was falling off because of the time lost while farmers were seeking shelter.

The B-29 gained a special niche among the gods of Japan. Every AAF man in the Empire, be he a clerk or a Grasshopper pilot, now commands the lowest bows of the Nipponese for in their minds each is a B-29 man. If a GI points to the sky, the Japs will sweep the ground while mumbling in reverence, "B-29, B-29; hai, hai."

The completeness of Japan's economic destruction was well summed up at an informal gathering of a group of the nation's leading industrialists. Their analysis was: "It would have been impossible to continue the war much longer; we probably could not have held out long enough to defend our home islands. The B-29s had sealed the fate of Japan as early as April and we felt that air raids would finish the war without invasion. We were badly beaten. The atomic bomb and Soviet entry into the war only speeded up the end."

Lieutenant General Tazoe, chief of staff of the Japanese Army Air Force, summed up the defeat more succintly. Said he, "Our air forces were defeated in the air by your 5th and 13th Air Forces. The B-29s dealt the death blow to Japan proper." ☆

DAY BY DAY

Major events in the battle against the forces of Japan from Pearl Harbor to VJ-Day

1941

DEC. 7. Japanese carrier planes attack Pearl Harbor, strike Hickam and Wheeler Fields, Hawaii. U. S. losses: 10 ships, including 5 battleships, sunk or put out of commission; 8 ships, including 3 battleships, damaged; 97 Army planes, including 23 bombers; 80 Navy planes; 2,343 Army and Navy personnel killed, 1,272 wounded, 960 missing, extensive damage to installations.

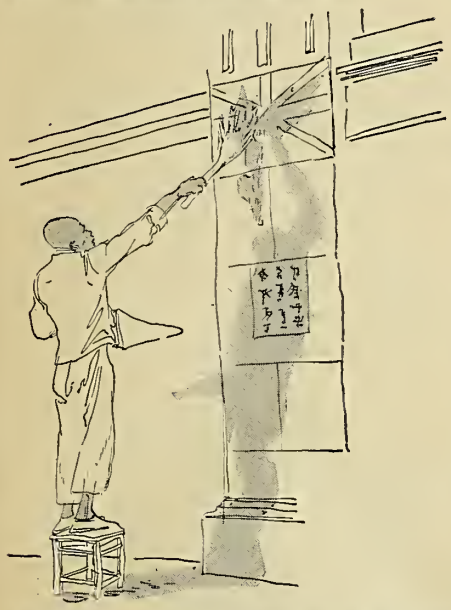
DEC. 7-8. In carrier and land-based strikes, Jap planes raid Clark, Nichols and Iba Fields in the Philippines, destroying three-fourths of an approximate 300 U. S. planes in the islands.

DEC. 8. United States declares war on Japan. Japs invade Thailand.

DEC. 9. In the first U. S. bombing mission of the war, B-17s of the 19th Bombardment Group attack enemy ships off the east coast of Vigan, P. I. Several hits are scored with one ship believed sunk. Bombs from B-17 commanded by Capt. Colin P. Kelly hit 29,000-ton Japanese battleship of the Haruna class.

DEC. 10. Japanese occupy Guam.

DEC. 18. Japanese occupy Hongkong.



DEC. 20. American Volunteer Group in China breaks up Jap bombing raid on Kunming, destroying at least four bombers without loss.

DEC. 22. In the first U. S. bombing mission from Australia, B-17s attack ships in Lingayen Gulf and off Davao, Philippines. On the return trip, they evacuate as many Americans as the planes will carry.

DEC. 23. Japanese occupy Wake Island.

DEC. 24. 4th Air Force sinks U-boat off California.

1942

JAN. 2. Manila falls.

JAN. 14. Tarakan, one of the last Dutch garrisons in Borneo, is overcome.

JAN. 15. Alaskan Air Force Headquarters activated at Elmendorf Field, Alaska.

JAN. 20. Japs raid Rabaul heavily.

JAN. 22-23. U. S. naval units, joined by B-17s and other Allied bombers, sink 8 to 12 Jap ships in the Battle of Macassar Strait. Japs occupy Rabaul.

JAN. 24. RAAF attacks shipping and supplies at Rabaul, beginning a long Allied air campaign against that Jap stronghold.

JAN. 31. First U. S. air units sent out from States since beginning of war arrive in Australia.

FEB. 3. One Jap bomber and one fighter downed in the first P-40 operation in NEI.

FEB. 5. Hawaiian Air Force redesignated 7th Air Force; Alaskan Air Force redesignated 11th Air Force; Caribbean Air Force redesignated 6th Air Force.

FEB. 9. Gasmata, New Britain, and Macassar, Celebes, occupied by Japs. In China, AVGs report 101st aerial victory.

FEB. 12. B-17s from Java and Australia start using tail guns. At Patterson Field, Ohio, 10th Air Force is activated.

FEB. 15. Singapore falls.

FEB. 17. British battleship Prince of Wales and battle cruiser Repulse sunk by Jap air action.

FEB. 19. In first Jap raid on Australia, Darwin is heavily damaged.

MARCH 1-31. Japs occupy Batavia, Java; Rangoon, Burma; Lae and Salamaua, New Guinea. General MacArthur arrives in Australia on B-17. U. S. fighters make first inception of enemy planes over Australian territory.

APRIL 8. 10th Air Force begins flying supplies over the Himalayas to Yunnan Province, China.

APRIL 9. Bataan falls.

APRIL 13-14. Three Australia-based B-17s and 10 B-25s attack Jap installations and shipping off Philippines.

APRIL 18. Lt. Col. James H. Doolittle leads 16 B-25s from the U. S. carrier Hornet in a daring but costly attack on Tokyo, Nagoya, Kobe and Yokohama.

APRIL 25. Five B-17s of 10th Air Force bomb Andaman Islands in Bay of Bengal.

APRIL 28. AVG reports shooting down 22 Jap planes over Lashio terminus of Burma Road.

MAY 1. Jap occupation of Burma complete. Burma Road, last land link with China, severed; Japs begin invasion of southwestern China via Burma Road.

MAY 4-8. In Battle of Coral Sea, 11 Jap vessels are sunk and U. S. loses its carrier Lexington. Allied land-based planes participate with naval air units.

MAY 5. Jap invasion of southwestern China stopped on banks of Salween River by AVG bombing and strafing attacks which destroyed Jap armored spearhead.

MAY 6. Corregidor surrenders. Japs occupy Hollandia, New Guinea.

JUNE 3. Japs bomb Dutch Harbor, Alaska, and landings at Attu, Agattu and Kiska follow.

JUNE 3-7. 7th Air Force B-17s and torpedo-carrying B-26s join naval air forces in repulsing a Jap invasion fleet in Battle of Midway; Japs lose 20 ships; U. S. losses: one destroyer and the carrier Yorktown.

JUNE 11. 11th Air Force bombers make first attack on Kiska, principal Jap base in the Aleutians.

JUNE 21. First counter blow by 7th Air Force struck by B-17s against Wake Island, only Jap target accessible from Oahu.

JUNE 27. First American bombers (six B-25s) reach China.

JULY 4. China Air Task Force activated at Peishiyi. AVG becomes 23rd Fighter Group.

JULY 3-8. First American raids on Hankow, Canton and French Indo-China by China Air Task Force.

JULY 6. Japs land at Guadalcanal.

JULY 12. ATC activates Pacific wing.

JULY 22. Japs occupy Buna and Gona, head for Kokoda.

JULY 30. B-17s make first land-based raid on Guadalcanal from New Caledonia bases.

AUG. 3. In their first combat action, P-38s of 11th Air Force shoot down two Jap flying boats.

AUG. 4. Maj. Gen. George C. Kenney assumes command of Allied Air Forces, Southwest Pacific Area.

AUG. 6. Fifteen B-17s strike Vunakanau, Rabaul, in preparation for Solomons landing; 75 Jap planes destroyed on ground and 11 in air.

AUG. 7. U. S. Marines recapture Tulagi and Lunga, Guadalcanal, preceded by 56 strikes by B-17s.

AUG. 23-25. Jap attack on eastern Solomons turned back in large-scale surface and air battles.

AUG. 27-SEPT. 7. Japanese repulsed at Milne Bay. U. S. units of Allied Air Forces in Australia become 5th Air Force.

SEPT. 12. Parafrags are used for first time in 5th Air Force attack on Buna airbase; 17 of 22 Jap planes destroyed on ground.

SEPT. 14. First XB-29 completes initial test flight over Seattle, Wash.

SEPT. 17. Japs penetrate to within 20 miles of Port Moresby.

SEPT. 20. CATF shoots down 22 Jap planes over Canton without loss.

OCT. 17. ATC activates Alaskan Wing.

OCT. 25. CATF drops first Allied bombs on Hongkong.

OCT. 25-26. In naval battle of Santa Cruz, Jap land-sea attack on Guadalcanal is turned back.

OCT. 26. Japs make first major raids on Assam bases of India-China air transport route destroying many transports and fighters on the ground.

NOV. 8. U. S. airborne troops land near Buna.

NOV. 12-15. In naval battle of Guadalcanal, Japs lose one battleship, five cruisers.

NOV. 22. Jap-held rail center at Mandalay, Burma, attacked by largest formation of U. S. bombers from India airbases to date.

NOV. 26. In round-trip of more than 2,700 miles—16½ hours—9 B-24s of 10th Air Force attack Bangkok, Thailand, in longest raid of war to date.

DEC. 1 ATC takes over aerial supply line from Assam to China. Allied Air Forces smash Jap convoy attempting to reinforce Buna.

DEC. 18. Japs occupy Alexishafen, Finschhafen, Madang and Wewak.

DEC. 24. Twenty-six B-24s of 7th Air Force attack Wake Island in the longest offensive mission to date—4,300 nautical miles round-trip with Midway as the only stop.

DEC. 28. P-38s make New Guinea debut.

DEC. 30. Allies cut enemy position in two at Buna.

1943

JAN. 13. 13th Air Force activated in the Solomons.

FEB. 9. U. S. occupation of Guadalcanal completed.

MARCH 1-4. In Battle of Bismarck Sea, 137 planes of 5th Air Force and RAAF destroy Jap convoy carrying supplies and nearly a division of troops from Rabaul to Lae, shoot down 102 aircraft with loss of two P-38s and one B-17; minimum altitude attack used.

MARCH 10. 14th Air Force activated at Kunming to supersede China Air Task Force.

APRIL 1-4. 5th Air Force shipping strike at Kavieng costs Japs two warships sunk, three warships damaged and three merchant vessels damaged; heavy cruiser hit by skip-bombing B-17 and beached.

APRIL 12. Port Moresby attacked by 100 Jap planes.

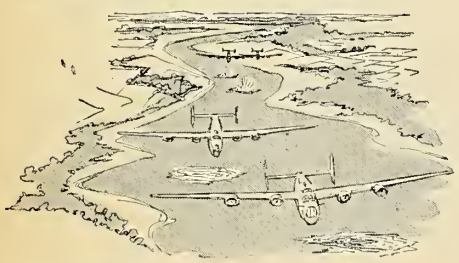
APRIL 13. Milne Bay attacked by 75 Jap planes in one of last major offensive strikes by air at his perimeter objectives.

APRIL 23. 7th Air Force B-24s staging from Funafuti in Ellice Islands, strike Tarawa for first time, scoring direct hits on fuel tanks and barracks areas.

MAY 1. B-24s, B-25s, P-38s and P-40s of 11th Air Force attack Kiska and Attu. Forward echelon of 14th Air Force moves into east China along Hengyang-Kweilin line bringing American planes within range of all major Jap occupied bases from Hankow to French Indo-China and making China Sea shipping vulnerable to air attacks.

MAY 11. U. S. forces land on Attu.

MAY 12. 14th Air Force B-24s begin mining Yangtze River and harbor of Canton, Hong Kong, Haiphong, Hankow, Shanghai and Takao on Formosa.



JUNE 2. With aid of 14th Air Force, Chinese forces check Jap advance into Yangtze Valley and dislodge Japs from part of Hunan.

JUNE 14. Allied airplanes shoot down 94 of 120 Jap planes attempting attack on Guadalcanal. Allied losses: six planes.

JUNE 21. Japs raid Darwin, losing 22 of 48 planes to Allied fighters.

JUNE 22. Over Lae, Allied planes shoot down 23 of 36 Jap fighters.

JUNE 24. Macassar, Celebes, heavily bombed by Allied planes.

JULY 19. From bases on Attu, eight B-24s of the 11th Air Force bomb Paramushiro and Kuriles.

JULY 22. Longest non-stop bombing mission in Southwest Pacific to date flown by six B-24s of 5th Air Force—2,400 miles round-trip to Soerabaja.

JULY 25-AUG. 1. 23rd Fighter Group of 14th Air Force beats off Jap day and night air blitz on east China fields, destroying 75 enemy planes.

AUG. 17-18. More than 200 enemy aircraft destroyed by 5th Air Force in heavy Allied air attacks on Wewak.

SEPT. 4. During Allied landing east of Lae, AAF shoots down 21 enemy planes.

SEPT. 5. Paratroopers land on Nadzab, later to become major 5th Air Force base for operations against Wewak, Hollandia and Rabaul.

SEPT. 11. 11th Air Force B-24s and B-25s from Aleutian bases attack Paramushiro and Shimushu. Salamaua captured by Allied forces.

SEPT. 16. Lae captured by Allies.

SEPT. 18-19. 7th Air Force and Navy bombers attack Tarawa, Makin, Apamama and Nauru islands.

SEPT. 25. 14th Air Force begins skip-bombing Japanese shipping in South China Sea and Formosa Straits.

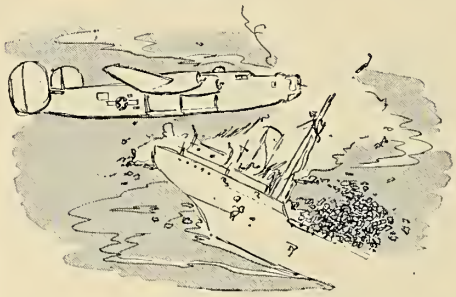
OCT. 2. Allies capture Finschhafen and close Vitiaz Straits.

OCT. 12. In a heavy 5th Air Force strike on Rabaul, 3 Jap destroyers, 46 cargo vessels, 70 harbor craft and 126 aircraft are destroyed by low-level strafe-bombing sweep and high-level B-24 strike.

OCT. 28. 14th Air Force B-24s operating as long range fighters on India-China Hump patrol shoot down 8 Jap fighters.

NOV. 1. Allies land at Empress Augusta Bay. Chinese-American Composite Wing goes into action with 14th Air Force, bombing Amoy and Swatow on China coast.

NOV. 2. Seventy-five 5th Air Force B-25s attack enemy shipping in Simpson Harbor, Rabaul, sinking 3 destroyers and 8 merchant ships and destroying 85 enemy aircraft on the ground and in the air.



NOV. 5. 5th Air Force attack on Rabaul destroys 26 Jap aircraft, 6 heavy cruisers and 2 light cruisers.

NOV. 25. First American air attack on Formosa made by B-25s and P-38s of 14th Air Force. At Shinchiku airdrome, 42 enemy planes destroyed without loss.

NOV. 26. Allied forces land on Cape Gloucester.

NOV. 27. Black Friday on the Hump. Five China-bound transports shot down by Jap fighters.

NOV. 25-DEC. 6. Combined 14th, 10th and RAF B-24 attacks on Rangoon area aimed at neutralizing port and rail facilities as diversionary support for General Stilwell's Chinese-American task force invasion of North Burma from Ledo. Combination of 14th Air Force and Chinese armies defeat Japs in Battle of Changteh inflicting 20,000 casualties.

DEC. 17. 7th Air Force moves into Gilberts to aid in neutralizing Wotje, Mille, Maloelap and Jaluit.

DEC. 22-23. Last Jap attempts to raid China Hump terminals beaten off with heavy losses.

DEC. 31. 14th Air Force announces sinking of 125,000 tons of Jap shipping in low-level attacks since September campaign started.

1944

JAN. 2. Allied forces land at Saidor on the north coast of New Guinea.

JAN. 7-13. Bombers of 5th Air Force drop 665 tons of bombs on Madang, Alexishafen and Bogadjim area of New Guinea.

JAN. 31. U. S. forces land in Marshalls; Majuro atoll occupied without opposition; this is the first prewar Jap territory to be taken by U. S. troops. ATC sets Hump record flying 20,000 tons of supplies to China in 30-day period.

FEB. 1. Allies land on Kwajalein. Reduction of Jap merchant shipping to date is estimated at 40 percent.

FEB. 3-4. Allied air strikes on Wewak destroy more than 80 enemy planes in air and on ground.

FEB. 8. Organized resistance ceases on Kwajalein, opening way for assault on Marianas.

FEB. 15. Green Island occupied, strategically ending Solomons campaign.

FEB. 16-17. In a surprise blow at Truk, U. S. carrier and battleship forces destroy 129 enemy planes and 42 ships, forcing Jap planes to pull back from Rabaul for future defense of Truk.

FEB. 19-21. Eniwetok invaded by Allied forces.

FEB. 21-22. Carrier force bombs enemy installations on Saipan, Tinian, Rote and Guam in preparation for invasion to establish B-29 bases; 134 Jap planes destroyed.

FEB. 29. Admiralty Islands invaded, after pounding by 5th Air Force, to provide a base for flank protection of New Guinea landings.

MARCH 11. Wake Island attacked by 22 heavy bombers of 7th Air Force dropping approximately 50 tons of bombs.

MARCH 11-15. Wewak airdromes attacked by 300 heavy and medium bombers dropping 571 tons of bombs; 59 enemy aircraft destroyed and 24 probably destroyed; Wewak airdromes are neutralized for any large-scale future use. B-24s made first land-based air attacks on Truk from New Guinea and Kwajalein.

MARCH 15. Japs invade India through Manipur Province penetrating to within 20 miles of Assam-Bengal railway and threatening to isolate General Stilwell's forces in North Burma.

MARCH 19. Jap Hollandia-Wewak convoy attacked by 5th Air Force with virtually all ships destroyed.

MARCH 29-30. U. S. carrier planes destroy 160 Jap planes, lose 25, in attack on Palau, Yap, Ulithi and Woleai. B-24s of 7th and 13th Air Forces hit Truk on alternate days until it is neutralized.

MARCH 29-APRIL 3. 5th Air Force heavy and medium bombers with strong fighter cover destroy approximately 300 enemy planes and airdrome facilities at Hollandia.

APRIL 2. First B-29 of 20th Bomber Command arrives in India.

APRIL 17. Japs open major offensive aimed at throwing 14th Air Force out of East China and opening land route from Manchuria to Singapore. First phase is crossing of Yellow River and drive toward Hankow to close Peking-Hankow railroad gap.

APRIL 18. Saipan, Tinian and Aguijan Islands in Marianas bombed in daylight by B-24s and PB4Ys of 7th Air Force and Navy, staging from Eniwetok to Admiralties and return—a 4,300-mile shuttle mission.

APRIL 22. Allies land on Aitape and Hollandia in first joint effort by Southwest Pacific forces under General MacArthur and Central Pacific forces under Admiral Nimitz.

APRIL 24. Hollandia captured.

APRIL 26. Allies enter Alexishafen.

APRIL 30-MAY 1. Carrier planes striking Truk destroy 125 enemy aircraft.

MAY 1. Specially equipped B-24s of the 14th Air Force begin radar night attacks in South China Sea. Chinese troops cross Salween River in drive to re-open Burma road.

MAY 12. B-24s of 14th Air Force sink 40,000 tons of Jap shipping, including an 18,000-ton floating whale oil factory off Cap St. Jacques near Saigon.

MAY 15. B-24s of 14th Air Force hit shipping and oil storage tanks in first Allied bombing of Saigon.

MAY 27. Landings on Biak Island with heavy air cover. Japs begin second phase of east China offensive jumping off from Yochow and driving south to capture 14th Air Force advance bases and close gap in Hankow-Canton railroad.

JUNE 2-5. In 13 attacks on Biak and Owi by Allied bombers, 59 enemy planes destroyed and 15 probably destroyed.

JUNE 5. B-29s hit Bangkok marshalling yards in first combat mission from India.

JUNE 8. AAF aircraft repulse Jap effort to reinforce Biak, sinking one Jap destroyer, leaving another in sinking condition and firing two more.

JUNE 11. Carrier planes hit Saipan, Tinian, Rota, Pagan and Guam, destroying 150 enemy aircraft.

JUNE 15. In first B-29 combat mission from China bases and first attack by land-based American planes on the main Jap Islands, 47 Superfortresses bomb Yawata, steel center on northern Kyushu, in night attack. Far East Air Forces activated. Lt. Gen. George C. Kenney commanding.

JUNE 16. 5th Air Force attack at Jefman-Samate, New Guinea, destroys 60 Jap planes.

JUNE 18. In attack on our sea forces covering Saipan operation, Jap carrier striking force loses 402 planes. Our losses: 17 planes and superficial damage to 2 carriers and a battleship. Action later known as First Battle of the Philippine Sea.

JUNE 19-20. Aircraft from Task Force 58 attack Jap carrier striking force; Jap losses: 5 ships sunk, 3 ships possibly sunk, 10 or 11 ships damaged, 26 Jap planes shot down. Our losses: 93 planes.

JUNE 23. A-26 makes operational debut in Southwest Pacific in shipping sweep at Manokwari.

JUNE 29. 14th Air Force field at Hengyang falls to Japs and siege of Hengyang city begins. 14th Air Force fighters and bombers fly round-the-clock attacks on Jap bases, supply lines and advanced columns.

JULY 1. Noemfoor Island occupied by combined paratroop-amphibious operation. Japs begin third phase of East China offensive driving north from Canton toward junction with forces moving south along Canton-Hankow railroad. Total of 500,000 Jap troops involved in campaign from Yellow River to Indo-China border.

JULY 8. Organized resistance ends on Saipan.

JULY 13. Iwo Jima bombed for first time by land-based aircraft of 7th Air Force.

JULY 15. Reports show Jap operational aircraft strength in Philippines has increased from 50 to 350 in three months. Chinese credit 14th Air Force with killing 18,000 Jap troops and 3,000 cavalry and pack horses during first six weeks of east China campaign.

JULY 18. 14th Air Force planes in east China grounded for lack of gas. Japs renew siege operations around Hengyang and rush supplies to front while American planes are grounded.

JULY 19-20. Tojo cabinet falls; General Kuniaki Koiso commissioned by Emperor to form new administration.

JULY 20. Guam invaded by Allies.

JULY 23. Landings on Tinian near Saipan, supported by 7th Air Force B-25s.

JULY 27. First heavy blow at Halmaheras struck by 62 B-24s and 48 B-25s of 5th Air Force with P-38 cover; 45 enemy planes destroyed on ground.

JULY 31. Organized resistance ceases on Tinian.

AUG. 3-4. Carrier and surface units hit Bonins-Volcanos, destroying at least 10 large Jap ships.

AUG. 8. Hengyang falls after 49-day siege and Japs sweep on toward next airbase at Lingling. Effective Chinese resistance ends with fall of Hengyang.

AUG. 9. Organized resistance on Guam ceases.

AUG. 10. 7th Air Force accelerates campaign against Iwo Jima and Bonins.

AUG. 16. Myitkyina falls to Chinese-American Task Force after 72-day siege.

AUG. 20. First B-29 daylight attack on Japan from China bases.

SEPT. 14. Allied landings on Peleliu in Palau.

SEPT. 15. Allies seize Morotai, 300 miles from the Philippines.

SEPT. 30-OCT. 18. B-24s of 13th and 5th Air Forces make series of five heavy daylight attacks on Balikpapan, Borneo, oil center; fighters escort bombers on last three.

OCT. 10. First B-29 arrives on Saipan.

OCT. 11-15. Combined Navy carrier, B-29 and 14th Air Force attacks on Formosa and South China Sea ports complete air blockade of Jap sea lanes to its southern empire. Carrier planes destroy 416 enemy aircraft over Formosa while losing 66. B-29s wipe out aircraft factory at Okayama on Formosa. Bombers of 14th Air Force heavily damage remnants of Jap shipping seeking refuge from carrier attacks in Hong Kong harbor.

OCT. 20. Allied forces land on Leyte.

OCT. 22-27. Second Battle of the Philippine Sea; enemy losses: 3 battleships, 4 carriers, 6 heavy cruisers, 2 or 3 light cruisers, several destroyers. U. S. losses: 1 light carrier, 2 escort carriers, 2 destroyers, 1 destroyer escort.

NOV. 8. Liuchow, last major 14th base in east China, falls to Japs. Fighter squadrons of 14th move to bases behind Jap lines and begin intensive guerrilla attack on Jap rear.

NOV. 10. 13th Air Force moves to Morotai to give flank protection to route to Philippines.

NOV. 24. First B-29 attack on Japan from newly established base on Saipan; Tokyo bombed.

NOV. 30. After devastating attacks in Philippines by 5th and 13th Air Forces throughout the month, Jap air activity in Leyte area dwindles to "nuisance" level.

DEC. 7. Fighter-bombers of 5th Air Force and Marine Air Groups smash enemy convoy of 13 ships attempting to reinforce Leyte. Simultaneously, Allied convoy lands at Ormoc behind enemy forces.

DEC. 8. 14th Air Force guerrilla fighter squadrons make strikes on Nanking and Hong Kong on Jap anniversary of Pearl Harbor. A destroyer, five transports and 24 planes destroyed.

DEC. 11. Another convoy heading for Leyte destroyed by land-based aircraft.

DEC. 14. Land-based strikes by 13th and 5th Air Forces on Negros Island in the Philippines destroy over 100 Jap planes.

DEC. 14-16. Carrier strikes on Luzon destroy 235 enemy aircraft.

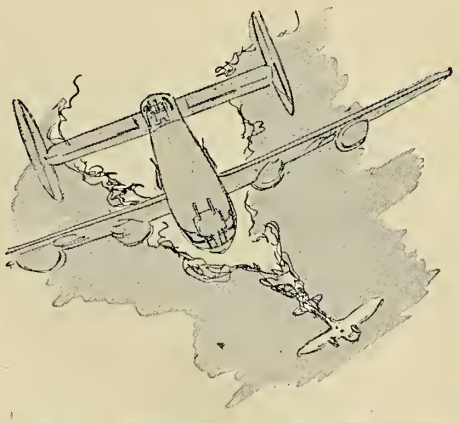
DEC. 15. Mindoro Island invaded by Allied forces; fighter fields in operation on D plus 2.

DEC. 18. Combined B-29 and 14th Air Force daylight attack on Hankow neutralizes most important Jap base in China and marks beginning of end of Jap airpower in China.

DEC. 26-27. Jap naval task force repulsed off Mindoro by B-25s, P-40s, P-38s and P-47s.

1945

JAN. 1-31. American and RAAF planes hit enemy bases on 2,000-mile arc. Striking first from Palau and Morotai and later from the Philippines, bombers and fighters soften up Clark Field, Fort Stotsenburg, Cavite Naval Base, and Baguio, disrupting Jap communications, supplies, equipment and personnel.



JAN. 3-4. Heavy carrier task force attacks Formosa and Okinawa, destroying 111 enemy planes and damaging 228, sinking 27 ships and damaging 68.

JAN. 6-7. Carrier based planes and B-29s from China hit Formosa while A-20s, B-24s, B-25s and P-38s heavily bomb and strafe network of airstrips between Clark Field and Angeles airdrome. These attacks support convoy of Allied troops heading for Lingayen Gulf. Jap suicide planes attack our ships.

JAN. 9. Allies land at Lingayen Gulf, Luzon; only two Jap airplanes rise to challenge the landing and one of them, a suicide plane, is shot down.

JAN. 11. Four Snooper B-24s, in first attack from Pacific bases on Formosa, strike Heite airfield.

JAN. 12. Carrier planes strike Indo-China coast, destroying 92 Jap planes and 127,000 tons of shipping.

JAN. 17-20. 14th Air Force guerrilla fighters sweep Shanghai airfields destroying 120 enemy aircraft while losing two pilots.

JAN. 22. In the first daylight attack on Formosa by Philippine-based planes, one group of B-24s escorted by 53 P-38s strikes Heite airdrome, causing fires and destroying enemy aircraft on the ground.

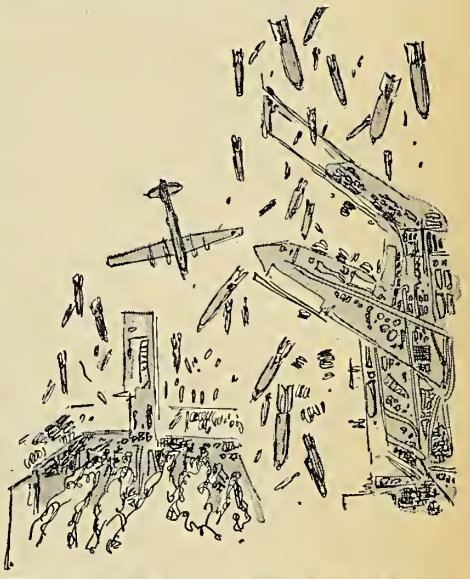
JAN. 23. Corregidor heavily bombed preparatory to airborne landings.

JAN. 25. First convoy arrives in China over Ledo road from India marking end of three-year land blockade.

JAN. 28. Allied ground forces take Clark Field and Angeles airdrome; more than 500 destroyed or damaged enemy planes are found on the ground in Clark area.

JAN. 30. 14th Air Force fighters destroy 168 enemy aircraft in series of sweeps over Hankow. Last B-24 mission unescorted over target and unchallenged by Jap fighters. ATC sets new Hump record flying 44,000 tons of supplies to China.

FEB. 1. B-29s from India destroy world's largest drydock at Singapore in 3,873-mile round-trip.



FEB. 3. U. S. troops enter Grace Park on northern outskirts of Manila. Allied paratroopers land on Tagayutay Ridge northwest of Lake Taal and start drive north toward Manila.

FEB. 5-6. 13th Air Force heavy bombers resume attacks on Borneo.

FEB. 12-13. Cavite Naval Base and Nichols Field taken.

FEB. 15. U. S. units land at Mariveles, southern tip of Bataan.

FEB. 16-17. U. S. parachute troops and amphibious forces land on Corregidor following an aerial campaign which began Jan. 23. In two days, C-47s of the 317th Troop Carrier Group drop 1,999 paratroopers and 1,292 bundles of supplies on target area of little more than one square mile. First naval task force attack on Tokyo destroys 509 enemy planes and probably destroys or damages 150 others, as well as destroying several vessels and ground installations. Climaxing 68 consecutive days of bombing by Allied planes on Iwo Jima, naval task force starts bombarding the island.

FEB. 19. Marines land on Iwo Jima.

FEB. 21. Philippine-based B-25s begin flying China Sea shipping sweeps relieving 14th Air Force planes for attacks on central and East China Jap bases.

FEB. 25. In greatest attack on Tokyo to date, 200 B-29s bomb Jap capital. Organized resistanee ceases in Manila.

FEB. 25-26. Tokyo raided by 600 carrier planes.

FEB. 27. Organized resistance ceases on Corregidor.

FEB. 28. A-20s and P-38s support unopposed landing near Puerto Princesa, Palawan; two days of heavy bombing preceded landing.

MARCH 1. Aerial blockade along French Indo-China coast cuts Jap shipping 50 percent in six weeks.

MARCH 6. B-25s carry out major daylight strike against Hainan Island. Two groups, covered by group of P-38s, hit Samah airdrome.

MARCH 9. Two hundred seventy-nine B-29s drop 1,655 tons of bombs on Tokyo, burning out 15.8 square miles of city in first of great incendiary raids, leaving fires visible 150 miles. Following long aerial campaign by the 13th Air Force, unopposed landing was made by Allied forces on Zamboanga Peninsula, Mindanao. Japs attack French Indo-China.

MARCH 11. Over two square miles of Nagoya ablaze from 1,790 tons of incendiaries dropped by 285 B-29s.

MARCH 13. Osaka, Japan's second largest city, hit by 274 Superfortresses, 8.1 square miles of city in flames.

MARCH 15. 14th Air Force fighters make 1,550-mile sweep to wipe out Jap air strength at Tourane, French Indo-China.

MARCH 16. Kobe hit by 2,328 tons of incendiaries dropped by 306 B-29s; 2.9 square miles of the city in ashes. Resistance ceases on Iwo Jima, nearly all of the original garrison of 20,000 having been annihilated.

MARCH 18-21. Carrier planes attack Kyushu and raid Jap fleet units in the Inland Sea. First fire blitz ends with 290 B-29s striking Nagoya with 1,838 tons of incendiaries, burning out 3 square miles.

MARCH 20. British 14th Army captures Mandalay.

MARCH 27. B-29s lay first mines in Jap Inland Sea to bottle up Jap fleet during occupation of Okinawa, marking important new phase of aerial blockade.

APRIL 1. In Pacific war's greatest amphibious operation, 100,000 Americans land on Okinawa.

APRIL 1-2. Chinese-American Wing and 14th Air Force fighters hit Shanghai fields, crippling Jap bomber force concentrated for attacks on Okinawa invasion fleet.

APRIL 2. U. S. troops invade Bicol Peninsula, Luzon, supported by 45 B-24s, 28 A-20s and 46 fighters.

APRIL 3. Philippine-based B-24s and P-38s strike shore installations and shipping in Hong Kong area. Allied units land at Masbate Island, completing occupation or control of every major Sibuyan Sea Island.

APRIL 5. Premier Koiso and Cabinet resign.

APRIL 6. Allied operations in Okinawa resisted by 400 to 600 enemy planes; offensive of JAF in first few weeks of this campaign is the greatest in its history.

APRIL 7. For first time, B-29s have fighter escort; 80 P-51s based on Iwo Jima join 300 Superforts in attacks on aircraft factories at Tokyo and Nagoya; 21 Jap fighters shot down and two P-51s lost; aircraft engine plant at Nagoya destroyed.

APRIL 12. In 3,800-mile round-trip, longest to date, B-29s bomb Koriyama 100 miles north of Tokyo. Complete control of the Visayas in the Philippines is insured with landing and occupation of Bohol Island.

APRIL 17-MAY 11. B-29s begin series of strikes against Kyushu Kamikaze airfields in support of Allied operations at Okinawa, help cut Jap aerial strikes from 500 to 50 planes.

APRIL 27. 13th Air Force and RAAF heavy bombers strike Soerabaja, Java.

APRIL 29. Operating for first time in bombing and strafing mission over Japan, P-51s based on Iwo Jima attack Atsugi airfield in Tokyo area, destroying or damaging 84 Jap planes.

APRIL-MAY. Combination of Chinese-American Wing planes and Chinese armies defeats Japs in battle of Chihkiang. Jap attempt to take last American air base in east-central China fails with cost of 20,000 casualties.

MAY 1. Australian units land on southwest Tarakan after area is softened up by heavy and medium bombers and fighters.

MAY 3. Baguio captured. Allied forces enter Rangoon; Japs retreat toward Thailand.

MAY 5. Targets in Amoy area bombed in force by B-24s of 5th and 13th Air Forces which hit Kaochi airdrome and nearby oil storage tanks.

MAY 6. By-passed Wewak captured.

MAY 14. Second B-29 fire blitz launched—3.15 square miles of Nagoya burned out.

MAY 16-17. In one of the largest ground support strikes of Pacific war, approximately 200 P-47s, P-38s and P-51s hurl fire bombs on Jap troops encircled in Ipo Dam area; about 350 tons of napalm bombs dropped in 410 sorties in two days; Ipo Dam captured three days ahead of schedule. Incendiaries from B-29s fire 3.81 square miles of Nagoya; half of Mitsubishi aircraft plant—largest in world—destroyed.

MAY 23. Tokyo area hit by 520 B-29s, dropping 3,700 tons of bombs.

MAY 25. Tokyo again struck by 564 B-29s; 22.1 square miles of city area destroyed in two attacks.

MAY 28. Jap casualties in Philippine campaign to date: 378,000. Japs evacuate former 14th Air Force base at Nanming breaking enemy land line of communication through China.

MAY 29. 450 B-29s destroy 6.9 square miles of Yokohama.

JUNE 1. Over three square miles of Osaka burned out by B-29s.

JUNE 2. Recapitulation discloses 2,117,000 tons of enemy snipping sunk during the first five months of 1945 by SWPA Allied Air Forces. Over four square miles of Kobe burned out by 3,000 tons of incendiaries.

JUNE 2-3. Hozan, largest Jap supply center of Formosa, bombed by 45 B-24s with 117 tons of demolition bombs.

JUNE 3. For the first time, 13th Air Force B-24s strike Batavia, Java, bombing seaplane base; entire round-trip from Palawan takes more than 18 hours. Over two square miles of Osaka burned out as second B-29 fire blitz ends.

JUNE 15. 14th Air Force total of Jap shipping sunk and damaged reaches 2,250,000 tons.

JUNE 17. After heavy raids by B-24s, B-25s, Beaufighters and P-38s, landings are made at Labuan, Muara and Brunei Peninsula, Borneo. B-29s begin hitting secondary industrial cities with night incendiary attacks.

JUNE 21. Eighty-two-day battle for Okinawa ends with collapse of organized Jap resistance; enemy dead exceed 100,000.

JUNE 30. Balikpapan bombed 18th consecutive day by 5th and 13th Air Forces and RAAF preparatory to landing. Japs evacuate 14th Air Force base.

JULY 1. Jap air force in China no longer a military threat; total box score of 14th Air Force—2,300 Jap planes destroyed at a loss of 464 American planes. Supported by Liberators of 13th, 5th and Royal Australian Air Forces, Australian troops land at Balikpapan.

JULY 3-4. More than 475 B-29s strike Tokushima, Takamatsu and Kochi on Shikoku and Himeji on Honshu Island. Airdromes in Tokyo Bay area rocketed and strafed by 132 Mustangs of 7th Fighter Command.

JULY 5-7. AAF and RAAF bombers lend heavy support to difficult Australian advance in Balikpapan and Brunei Bay sectors.

JULY 8-10. Sendai, Sakai, Wakamatsu and Gifu attacked by 497 B-29s; 63 stripped-down special radar B-29s hit Usube River oil refinery at Yokkaichi; 30 B-29s lay mines in Shimonoseko Strait, Niigati harbor and Nanao Bay; 100 Mustangs sweep airdromes in Osaka, Nagoya and Tokyo areas.

JULY 12-13. Fire and demolition bombs dropped by radar by 506 B-29s in raids on Kawasaki petroleum center and urban section of Utsunomiya, Ichinomiya, Tsuraga and Uwajima. B-24s, A-26s and P-51s strike Formosa.

JULY 14-15. In first bombardment of Jap home island in 80 years, naval surface vessels shell Kamaishi on Honshu and Muroran on Hokkaido. Radar B-29s destroy Nippon Oil Co. at Kudamatsu.

JULY 16-17. On night missions, 471 B-29s carry out incendiary attacks against Numazu, Kuwana and Hiratsuka on Honshu and Oita on Kyushu. More than 140 5th Air Force heavies and mediums hit Shanghai area.

JULY 19-20. Visually and by radar, 547 Superfortresses drop record 4,000 tons of incendiary and demolition bombs on industrial sections on Fukui, Hitachi, Chosi and Okazaki on Honshu.

JULY 18. 5th and 7th Air Forces heavies and mediums from Okinawa pound Shanghai area.

JULY 21-23. Numerous targets in Osaka area attacked by 105 Mustangs. Ube synthetic oil plant destroyed by 77 radar B-29s.

JULY 24. Large force of Okinawa-based bombers and fighters strikes Shanghai installations. Four large aircraft factories, Osaka arsenal and textile mill in Osaka-Nagoya sector hit by 599 B-29s, bombing visually and by radar. Shipping sweeps between Japan and Korea begun by 5th and 7th Air Forces.

JULY 25. Oil center of Kawasaki hit by 76 radar B-29s.

JULY 26. U. S., Great Britain and China issue Potsdam unconditional surrender ultimatum to Japan. More than 350 B-29s drop fire bombs on Omuta, Matsuyama and Tokuyama. At Guam, Maj. Gen. Curtis LeMay names next 11 Jap cities to become victims of B-29.

JULY 27-28. Tokyo area attacked by 146 Iwo-based P-51s. Okinawa-based planes carry out widespread sweeps over Kyushu. Chinese troops enter Kweilin.

JULY 29. In unopposed night missions, 562 B-29s start general conflagrations in Uwajima, Ogaki, Usi-Yamada, Ichinomiya, Aomori, Tsu and in Shimotsu oil refinery at Wakayama.

JULY 30. Kobe district attacked by 130 P-51s.

JULY 31. Kyushu heavily hit by fighters and bombers.

AUG. 1. 10th Air Force Headquarters moves to China and takes over half of 14th Air Force tactical units.

AUG. 1-2. In largest Superfort attack to date, 766 B-29s drop incendiaries on Nagasaki, Toyama, Mito and Hachioji and high explosives on Kawasaki petroleum center. Southern Honshu hit by 129 P-51s.

AUG. 3. Eighty-five P-51s of 20th Air Force rocket and strafe airfields and industrial targets in greater Tokyo area.

AUG. 4. Okinawa-based planes concentrate fire and demolition bombs on Tarumizu and Miuakomojo, Kyushu, while 20th Air Force Mustangs swarm over targets north of Kyushu.

AUG. 6. First atomic bomb dropped on Hiroshima. P-51s of 20th Air Force return to targets north of Tokyo. Incendiaries dropped by 604 B-29s on Jap industrial areas and on Ube coal liquefaction plant.

AUG. 7. 5th and 7th Air Forces planes blast Kyushu targets and enemy convoy off Fusan, Korea.

AUG. 8. In night raids, 412 B-29s hit Nakajima aircraft plant in Tokyo. Shipping between Korea and Japan reduced practically to zero; 1,000,000 tons of shipping sunk or damaged by B-29 mining campaign.

AUG. 9. Soviet Union declares war on Japan. Nagasaki hit by second atomic bomb. Okinawa-based aircraft soften up tactical targets on Kyushu and Shikoku, destroy or damage 34 locomotives and 121 railroad cars.

AUG. 10. Soviet forces advance 100 miles in western Manchuria. Oil refinery at Amagasaki and Tokyo arsenal bombed by 165 B-29s escorted by 102 P-51s.

AUG. 11. Governments of United States, Great Britain, China and Soviet Union acknowledge officially receipt of a Jap offer to accept terms of Potsdam provided the declaration did not compromise "any demand" which prejudices the prerogatives of Emperor Hirohito as sovereign ruler.

AUG. 12. Secretary of State James F. Byrnes announces that Big Four have agreed to Jap surrender offer subject to condition that Emperor carry out orders of Supreme Allied Commander.

AUG. 14. In largest and last series of bombings, 833 B-29s blast industrial and urban targets. B-32s attack shipping along western coast of Kyushu and in Inland Sea, landing at base three hours after cease fire order. Japan Surrenders.

AUG. 28. Aerial occupation of Japan starts with advance recon force landing at Atsugi airdrome near Tokyo.

AUG.-SEPT. B-29s and C-47s drop medical supplies and paratroop rescue teams to all POW camps in Japan, Korea and China; 10th Air Force transports Chinese armies to reoccupy Nanking, Shanghai, Canton and Hankow. ☆

News and Views around the World

CROSS COUNTRY

Separation Stitch—Page 36

Exit

Under its peacetime domestic separation program, supervised by Continental Air Forces headquarters at Bolling Field, D. C., the AAF is discharging personnel at the rate of 10,000 a day, twice the number anticipated at the beginning of the program.

The fighter control room at Bolling, once geared for defense of the Washington area, has shed its tactical maps and plotting boards in favor of up-to-the-minute charts revealing the flow of men from their Z-I stations to separation bases, then home.

"Off we go, into the . . ."

This separations-control room, utilizing some of the communications methods developed under wartime conditions, maintains instant liaison with air force commands by telephone and radio.

Personnel returning from overseas continue to be processed at Army Service Forces centers. However, the AAF on September 17 undertook to separate its own personnel stationed in the U. S. and, by November 1, had effected the discharges of 69,709 officers and 212,428 enlisted men, a total of 282,137. The comparative rapidity of AAF discharges has enabled the projected program to be moved ahead, with permission of the War Department. By mid-October men with 60 points and two years' service were being separated—a goal originally set for November 1. A later ruling has made it possible for 45-point enlisted men with two years' service to be released on application. Pilots, navigators and bombardiers with 44 points and two years' service, who are stationed in the U. S., may be declared surplus and released unless they have elected to remain in the service until June 30, 1947, or for emergency plus six months.

Nerve center of the entire program, the control room at Bolling resembles the Wall Street stock exchange in that liaison officers "buy and sell" discharge quotas. These officers balance the quotas awaiting separation at designated bases with the number that can be handled by the various bases. A backlog of three times the daily separation rate is maintained to keep the processing line moving smoothly. A prospective civilian may have to wait a day or two before getting into this line, but once in it he receives his gold eagle patch within a day and a half.

The 35 separation bases operated throughout the country by CAF under the direction of Brig. Gen. Charles F. Born, Chief of Separations, have devised their own SOPs by trial and error and by a mutual exchange of ideas. Low-point ground crew and inductees green to Army ways have been put through intensive on-the-job training to replace high-point administrative specialists.

While it is impossible to discharge men and women the moment they become eligible, the AAF separation program is attempting with success, to effect release, the same month that individuals attain eligibility.

The separation bases include Westover Field, Mass.; Mitchel Field, N. Y.; Rome Army Air Base, N. Y.; Drew Field, Fla.; Maxwell Field, Ala; Baer Field, Ind.; Chanute Field, Ill.; Truax Field, Wis.; Scott Field, Ill.; Barksdale Field, La.; Lincoln Army Air Base, Neb.; Davis Monthan Field, Ariz.; Portland Army Air Base, Ore.; Richmond Army Air Base, Va.; Sioux Falls Army Air Base, S. D.; March Field, Calif.; Gowen Field, Idaho; Ellington Field, Texas; Randolph Field, Texas; San Antonio Air Center, Texas; Amarillo Army Air Base, Texas; Shepard Field, Texas; Lowry Field, Colo.; Roswell Army Air Base, N. M.; Newark Army Air Base, N. J.; Patterson Field, Ohio; San Bernardino Army Air Base, Calif.; Santa Ana Army Air Base, Calif.; McClellan Field, Calif.; Seymour Johnson Field, Goldsboro, N. C.; Greensboro Army Air Base, N. C.; Grenier Field, N. H., and Andrews Field, Md.

Ribbon Shower

Eligibility for wearing the American Theater Ribbon recently was extended to all military personnel who have served honorably on active duty in the continental United States for an accumulative period of one year, including permanent and temporary duty, during World War II. The terminal date of the eligibility period will be announced later.

Goodbye, Big 8th

The big airbases with which the 8th Air Force punctuated the British landscape, have just about disappeared. Residents of East England, whose daily lives were regulated by the roar of fighter and bomber formations, continually shuttling across the channel, now are scarcely aware of the dozen or so planes which pass overhead daily. The personnel have vanished, too, for of the more than 300,000 men and women who served under the banner of the 8th from August, 1942 to April, 1945, only 30,000 remained in late October—and even they had their bags packed.

The proud name, too, is gone, and the force that now operates in the UK is known as the 8th Fighter Command, headed by Maj. Gen. Westside Larsen, who was CG of the 3rd Air Force from September, 1943, until May, 1945, when he came to Europe.

The men still stationed in England are mostly a closing-out force, and their mission will soon be accomplished, for every week the bull's-eye banner of the Royal Air Force goes up over more and more bases as caretaker troops return them to the British. Some units, however, like the 96th Bomb Group at Snetterton Heath, have been tabbed for duties with the occupation forces and remain fully stocked with men, planes and equipment. Business, too, is pretty nearly the same with the 94th Bomb Group at Bury St. Edmunds and the 110th Bomb Group at Thorpe Abbots.

But at other installations the runways are deserted and the hardstands are empty. A holding party of about 50 men stands guard duty at the 95th Bomb Group's home at Horham, waiting for the RAF to take over. The 385th near Great Ashfield is a ghost base. Civilians roam roads that were once taboo, leading to the 388th at Knettishall. Cyclists use the runways of the 452nd at Deapham Green, the 486th near Sudbury, the 487th at Lavenham and the 490th near Eye, while cows graze contentedly at the 493rd (Debach) the 34th (Mendlesham) the 357th (Leiston) and the 55th (Wormingsford).

Cameras have replaced bombs at the 306th Bomb Group near Thurleigh, where three squadrons fly daily missions photographing western Europe from the air. Alconbury, where 8th Air Force "Mickey" operators trained during the war, has been taken over by the First Air Division, accompanied by an air service group and a weather reconnaissance squadron, and shiny Mustangs still line the perimeter at Duxford, home of the 78th Fighter Group.

The Yanks are still "up at the Abbey" to

the natives of High Wycombe. The big, rambling base—successively headquarters of the 8th Bomber Command and the 8th Air Force, now functions as the 8th Fighter Command Headquarters and is busy "closing the books" on all personnel and equipment formerly assigned to the 8th Air Force.

Flying Association

The Veterans Flying Association of America, formed in London last April by several members of the 8th Air Force to enable military pilots to continue flying at low cost after the war, has been granted a charter in Michigan, and a temporary national headquarters has been established at 333 West Mason Street, Jackson, Mich.

All men and women who served honorably in the armed services during World War II are eligible for membership, and a program is being set up to teach nonflyers to become pilots. One of the primary purposes of the organization is "to spread the advantages of cooperative action in the field of private flying equally among all of us," according to Kent Sagendorph, president of the association. Aviation writer and editor, Mr. Sagendorph served with the 8th Air Force as a major.

Regional officials of the association include Al Cohn, 2025 West Euclid, Detroit 6, Mich.; Robert L. Preis, 705 5th Avenue S. E., Cedar Rapids, Iowa; Walter E. Shelton, Greenville, Miss.; Edward I. Titlow, Jr., 746 42nd Avenue, San Francisco, Calif.; Martin Karant, Radio Station WKPT, Kingsport, Tenn., and Thomas Grosvenor, 1318 Salem Street, Malden, Mass.

P-80 on the Road

A jet-propelled P-80 was recently forced to land in a West Virginia bean patch, after running out of fuel. The pilot had brought the plane down without damage to the craft, but the terrain prevented him from taking off again for a return flight to Wright Field. Since the plane was needed in a pressing test program, dismantling the craft for overland shipment was not considered practical, and it was decided to fly the plane out by transferring it to the nearest suitable take-off place.

Accordingly, workmen loaded the Shooting Star onto a Navy barge and floated it down the Ohio river to a level stretch of highway. After a Wright Field pilot, Maj. R. E. Schlech, climbed into the cockpit the plane was towed over the entire length of the level road to familiarize him with the hazards. There were only four feet of leeway on either side of the landing wheels, and telephone wires crossed the highway making it necessary for the plane to swoop up quickly between the lines to get away free. To warn the pilot when he had to get airborne, a white cloth was hung over the last of the crossing lines.

Major Schlech was certain that he could keep the plane from running off the narrow "strip." Using 75-degree flaps, he throttled the I-40 engines to the proper mixture, and was able to get the P-80 off the ground

QUESTIONS
on Policy and Procedure

Q. If the beneficiary of a National Service Life Insurance policy is a mother and no second beneficiary has been named, who receives the payments upon her death?
A. *Payments will be made to beneficiaries as follows: (1) Widow, if living; (2) if no widow, to child or children (including adopted children) in equal shares; (3) if no widow or child, to the other parent; (4) if no widow, child or parents, to brothers and sisters (including those of the half-blood), in equal shares.*

Q. May officers wear civilian clothes while on terminal leave?
A. *Military personnel on terminal leave or retirement furlough may at their option wear civilian clothing during such period. (Par 1a, AR 600-40, C 3, 18 April 1945). If uniform is worn, the complete uniform prescribed or authorized for the occasion should be worn.*

Q. Is it true that the family allowance continues to be paid six months after a soldier is discharged?
A. *Eligibility to a family allowance ceases as of the end of the month in which the soldier is discharged. Any checks received for a period after that month must be returned to the Office of Dependency Benefits, Newark 2, N. J.*

Q. Are officers and enlisted men who enroll in the Officers' Reserve Corps or the Enlisted Reserve Corps entitled to mustering-out pay?
A. *Yes, if otherwise qualified (Sec IV, WD Cir 304, 1945).*

Q. May household goods be shipped home prior to actual discharge?
A. *Yes. Until further notice, in order to expedite demobilization, shipment of household goods which would be authorized at Government expense upon relief or discharge from active duty may be made before issuance of orders for such relief or discharge (Sec I, WD Cir 304, 1945).*

Q. Is a Wac officer entitled to terminal leave which accrued to her credit while an officer in the WAAC?
A. *Yes. An officer of the Women's Army Corps who entered upon active duty as of 1 September 1943 and whose service has been continuous since her original appointment as an officer in the Women's Army Auxiliary Corps is entitled to leave credits accruing but not availed of during her services as an officer in the WAAC (AR 605-115, par 3b (4) (b)).*

Q. May enlisted men travel in a car (TPA) even though they do not own or drive the car?
A. *There is no reason why enlisted men cannot travel in a car (TPA) and be entitled to a money allowance at the rate of three cents per mile, even though they may not own or drive the car, if traveling under competent orders which entitle them to transportation or transportation and subsistence as distinguished from mileage. See pars 29 and 30, AR 35-4810. However, in the case of separatees, the provisions of par 48b (2), RR 1-2, must be met before individual travel orders may be issued.*

Q. If a soldier serves over half of a six-month period overseas, is he entitled to wear an overseas stripe for that period?
A. *No. The full six months must be served overseas (WD Cir 268, 1944, as amended).*

Q. Is an unmarried veteran, who has a dependent mother and who goes to school under the GI Bill of Rights, entitled to the $25 a month subsistence allowance in addition to the $50 a month regular allowance?
A. *Yes. The Veterans Administration has ruled that dependent parents as well as wives and children will be considered dependents so far as the subsistence allowance is concerned.*

Q. May a loan be obtained under the GI Bill of Rights to pay operating expenses on a farm owned by a veteran until the first crop comes in?
A. *No. However, a farmer comes under the self-employment provision, and is entitled to be paid the difference between what he earns from the farm and $100 a month up to a maximum of 52 weeks.*

PREPARED BY THE OFFICE OF THE AIR INSPECTOR

NEW BOOKS

WAR

ATOMIC ENERGY FOR MILITARY PURPOSES. *Henry D. Smyth.* The official report on the development of the atomic bomb under the auspices of the U. S. Government, 1940-1945. PRINCETON UNIVERSITY PRESS, PRINCETON, 1945.

HISTORICAL

ARMAMENT AND HISTORY. *J. F. C. Fuller.* (Maj. Gen., British Army, Ret.) An authoritative study of the influence of armament on history from the dawn of classical warfare to World War II. SCRIBNER'S SONS, N. Y., 1945.

WINGS ACROSS THE WORLD: THE STORY OF THE AIR TRANSPORT COMMAND. *Hugh B. Cave.* A record of the world's most stupendous airline—its routes, bases, planes and exploits of the men. DODD, MEAD & CO., N. Y., 1945.

WOMEN IN AVIATION. *Betty Peckham.* Description of work done by women pilots, on the assembly line, in aircraft manufacture, and for commercial airlines. NELSON, N. Y., 1945.

POSTWAR

INTERNATIONAL AIRWAYS. *Alberta Worthington.* Limited to discussion of the commercial aspects of international aviation and freedom of the air. H. W. WILSON CO., N. Y., 1945.

PEACETIME CONSCRIPTION. *Julia E. Johnsen.* Documented arguments pro and con of a vital postwar problem: the proposal that the U. S. adopt a system of universal peacetime military training. H. W. WILSON CO., N. Y., 1945.

THE STANDARD GUIDE TO PRIVATE PLANES. *Lester Ott.* Descriptions of all personal-type aircraft and their engine specifications with a digest of federal flying regulations. AERONAUTICS PUBLISHING ASSOCIATES, N. Y., 1945.

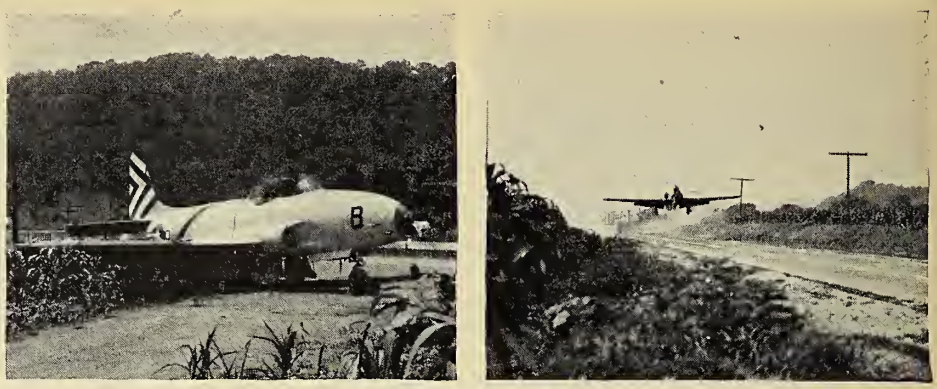
TECHNICAL

THE ART OF CALCULATION. *Henry Sticker.* Teaches in an easy way the basic method of arithmetical calculation universally used by experts. ESSENTIAL BOOKS, N. Y., 1945.

AUDELS QUESTIONS AND ANSWERS FOR ELECTRICIANS EXAMINATIONS FOR ALL GRADES COVERING THE NATIONAL ELECTRICAL CODE, QUESTIONS AND ANSWERS FOR LICENSE TESTS, OHM'S LAW WITH APPLIED EXAMPLES. *Edwin P. Anderson.* THEODORE AUDEL & CO., N. Y., 1945.

These books are available to AAF personnel through the AAF Field Technical Library Service, which provides for technical libraries at all major installations. For a complete list of books so available, see TECHNICAL PUBLICATIONS FOR ARMY AIR FORCES TECHNICAL LIBRARIES, Book List No. 2, March 1945, and supplements thereto. These lists are compiled by AAF Headquarters Library. Personal copies of these books may be obtained from the publishers or retail bookstores.

CROSS COUNTRY



Jet-propelled road hog.

between the overhead wires, thus saving hundreds of man-hours—and proving that the fastest fighter in the world has such excellent ground control characteristics that it can take off from an ordinary road.

When Greek Meets Greek

To speed the repatriation of the thousands of Greek nationals who formed a part of the Nazis slave-labor corps, the 40th Bomb Wing's Flying Fortresses have established two regular air routes for non-stop passenger flights between Munich and Athens, thus making certain that the great majority of Greeks in German territory are returned to their homes and families before the severity of winter sets in.

At Funk Kaserne, near Munich, the displaced persons who wish to go home are gathered together and quartered in barracks which formerly housed Wermacht soldiers. Approximately twenty-five passengers, including babies, children and old people, are loaded into each B-17, and their meagre possessions are permitted to accompany them regardless of weight. Taking off from the Munich Riem airdrome, the planes follow either a Munich-Brenner Pass-Foggia-Athens route, or follow a southern course via Marseilles, and approximately 15 hours later, land at Eleusis Airfield in Athens. Here, representatives of the Greek government meet the planes, and transport the repatriates to the Displaced Persons (D.P.) Station at the 8th Gymnasium in Athens, a large modern school building. Medical examinations are then given, records checked, food ration cards distributed, billets assigned and 2,000 drachmas handed to each refugee. The UNRRA then assists in the rehabilitation of the Greeks as restored citizens of their homeland.

The 40th Bomb Wing, commanded by Col. Anthony Mustoe, Bellevue, Penn., operates the 92nd Bomb Group, commanded by Lt. Col. Albert L. Cox, Washington, D. C., and the 384th Bomb Group, commanded by Lt. Col. Robert W. Fish, San Antonio, Texas. The 40th is stationed at Istres, near Marseilles, France.

Rush hour on the Munich to Athens express.

Station List

The Army Air Forces has submitted to the War Department its list of desired stations for the interim AAF organization, pending Congressional action to determine the size of the postwar AAF. The list, prepared by a board of senior commanders and staff officers after more than two months' intensive study, does not include flying fields for Organized Reserve or National Guard air units, or those of the Army Airways Communications System.

The recommended list of stations, by type, follows:

Combat Units: Clovis Army Air Field, Clovis, N. M.; Fort Worth Army Air Field, Fort Worth, Texas; Grenier Field, Manchester, N. H.; MacDill Field, Tampa, Fla.; Merced Army Air Field, Merced, Calif.; Pocatello Army Air Field, Pocatello, Idaho; Rapid City Army Air Field, Rapid City, S. D.; Roswell Army Air Field, Roswell, N. M.; Selfridge Field, Mt. Clemens, Mich.; Smoky Hill Army Air Field, Salina, Kan.; Walla Walla Army Air Field, Walla Walla, Wash.; Casper Army Air Field, Casper, Wyo.; Dow Field, Bangor, Me.; Kearney Army Air Field, Kearney, Neb.; Seymour-Johnson Field, Goldsboro, N. C.; Dover Army Air Field, Dover, Del.; March Field, Calif.; McChord Field, Tacoma, Wash.; Portland Army Air Base, Portland, Ore.; Westover Field, Chicopee Falls, Mass.; Biggs Field, El Paso, Texas; Las Vegas Army Air Field, Las Vegas, Nev.; Brooks Field, San Antonio, Texas, and Shaw Field, Sumter, S. C.

Air Transport and Troop Carrier Units: Bergstrom Field, Austin, Texas; Pope Field, Ft. Bragg, N. C.; Sedalia Army Air Field, Knobnoster, Mo.; Fairfield-Suisun Army Air Field, Fairfield, Calif.; Ft. Dix Army Air Base, Wrightstown, N. J.; Great Falls Army Air Field, Great Falls, Mont.; Morrison Field, West Palm Beach, Fla., and Topeka Army Air Field, Topeka, Kan.

Convalescent Hospitals: Ft. George Wright, Spokane, Wash.; Miami District Convalescent Hospital, Miami Beach, Fla.; Pawling Convalescent Hospital, Pawling, N Y., and San Antonio District Convalescent Hospital, San Antonio, Texas.

Flying Training: Columbus Army Air Field, Columbus, Miss.; Goodfellow Field, San Angelo, Texas; Moody Field, Valdosta, Ga.; Randolph Field, San Antonio, Texas; Perrin Field, Sherman, Texas; Enid Army Air Field, Enid, Okla.; Turner Field, Albany, Ga.; Barksdale Field, Shreveport, La.; Luke Field, Phoenix, Ariz.; Williams Field, Chandler, Ariz.; Langley Field, Hampton, Va., and Mather Field, Sacramento, Calif.

Technical Schools: Scott Field, Belleville, Ill.; Boca Raton Army Air Field, Boca Raton, Fla.; Buckley Field, Denver, Col.; Chanute Field, Rantoul, Ill.; Keesler Field, Biloxi, Miss., and Lowry Field, Denver, Col.

Tactical School: Maxwell Field, Montgomery, Ala.; Gunter Field, Montgomery, Ala., and Craig Field, Selma, Ala.

AAF Center: Eglin Field, Valparaiso, Fla., and Army Air Center, Orlando, Fla.

PLANE BONERS

Analyzed by Veteran Pilots

TACOMA, WASH.—Taking off for an hour of transition flying, pilot in a B-25H climbed to 7,000 feet and decided to try a chandelle. After a dive of about 250 mph indicated he banked and pulled up sharply. After returning to normal flight he noticed the left landing light was broken. Descending to traffic altitude he circled the field once, landed and taxied back to the line. It was discovered then that the upper surfaces of both wings were wrinkled from wing root to wing tip.

Comment: The B-25H has control boosters, but the pilot did not take this into consideration when he used strong and abrupt movements on the controls in pulling up at a high speed. Smooth, coordinated movement of controls are more necessary as speed and loading increase, and boosters make a distinct difference in the technique of handling controls.

CORSICA—A B-17F loaded up in Italy with spare airplane parts, five bags of mail, cots, bed rolls, 800 cans of beer and assorted PX rations and the personal baggage of the 15 men aboard. Taking off for a base in Corsica the pilot remarked jokingly that the airplane was loaded heavily and that he didn't know how he was going to get into the air. Take-off and flight to Corsica were uneventful. The approach for landing was normal until the bomber was about 25 feet above the runway. Then the tail dropped suddenly. The pilot tried to correct by advancing all four throttles but the B-17 simply climbed about 100 feet at a 60-degree angle, stalled, fell off on the right wing, crashed and burned.

Comment: From information supplied by survivors who loaded the ship it was found that the center of gravity was 13 inches aft of the safe range. The moral is obvious: the crew was unpardonably careless in loading the airplane. It might have turned out better even so if the pilot had not pourned on the coal when the tail suddenly dropped while only 25 feet above the runway. In view of his knowledge of tail-heavy load conditions — knouledge that should have been corroborated by trim in the air — he should reasonably have expected tail-heavy trouble in landing. It would have been better if he had let the plane drop in tail low.

AMARILLO, TEXAS—Foreed down by the loss of an engine on a 5,000-foot alternate runway, a B-29 ran out of runway despite the pilot's efforts to slow the airplane by blowing out the tires. The Superfort had landed approximately one-third down the runway and the pilot had put the brakes on as soon as the nosewheel was rolling, holding the brakes to blow the tires. The airplane still didn't stop until it was 100 feet off the runway in soft sod.

Comment: The advisability of blowing tires to shorten ground run is questionable. A sliding tire or metal surface does not have the breaking effect of a wheel with inflated tires which have been fully braked but not allowed to slide. Runways don't stretch. Utmost caution should be used in short field landings.

VAN NUYS, CALIF.—Pilot in a P-61 retracted landing gear at the time wheels broke from the ground. The night fighter settled on its belly and skidded to a stop at the side of the runway. Pilot claimed that the left engine coughed and lost power just as the airplane took off, causing it to settle.

Comment: Evidence disputes this pilot's claim. The distance from the end of the runway to the first prop mark in the runway was considerably shorter than the normal take-off run for a P-61. An engine inspection failed to uncover any cause for failure. The absence of any yaw when the left engine was supposed to have coughed and lost power makes it likely that the first contact with the runway by the prop gave the pilot the impression that the left engine lost power. Although the P-61 is a fighter airplane, it is as heavy as a medium bomber and takes off more slowly than a fighter.

McCOOK, NEB.—A B-29 pilot who had just completed two hours and 30 minutes of instrument flight, including a hooded take-off, flew his Superfort into the ground three miles south of a Nebraska airfield because the windows and windshield became clouded. The crew was lucky. Three received minor injuries; the other seven escaped unhurt. The airplane was completely wrecked.

Comment: This pilot had logged no first pilot instrument time in the six months preceding this accident and had received only four hours of qualified dual instrument time in that period. This alone was reason enough for the accident, which can be attributed to poor instrument technique.

PREPARED BY THE OFFICE OF FLYING SAFETY

Materiel Center: Wright and Patterson Fields, Dayton, Ohio.

Maintenance and Supply Depots: Kelly Field, San Antonio, Texas; Olmsted Field, Middletown, Pa.; McClellan Field, Sacramento, Calif.; Spokane Army Air Field, Spokane, Wash.; Tinker Field, Oklahoma City, Okla., and Robins Field, Macon, Ga.

Satellite Depots: Brookley Field, Mobile, Ala.; Hill Field, Ogden, Utah, and Rome Army Air Field, Rome, N. Y.

Specialized Warehouse Installations: Buffalo Specialized Depot, Buffalo, N. Y.; Dayton Specialized Depot, Dayton, Ohio; Gadsden Specialized Depot, Gadsden, Ala.; Maywood Specialized Depot, Maywood, Calif.; Memphis Specialized Depot, Memphis, Tenn.; Miami Army Air Field, Miami, Fla.; Shelby Specialized Depot, Shelby, Ohio, and Topeka Specialized Depot, Topeka, Kan.

Special Air Corps Installations: Lockbourne Army Air Base, Columbus, Ohio, and Muroc Army Air Field, Muroc, Calif.

General Ranges and Testing Areas: Almagorda Army Air Field, Almagorda, N. M.; Avon Park Army Air Field, Avon Park, Fla.; Myrtle Beach Army Air Field, Myrtle Beach, S. C.; Tonopah Army Air Field, Tonopah, Nev.; Tyndall Field, Panama City, Fla., and Wendover Field, Utah.

Why Not Stay In?

Let's give the old gripe of getting out a new twist and consider the proposition of staying in the AAF as the first and most important step toward a postwar career.

Let's consider it as a strictly business proposition, entirely aside from the job you would be doing as a member of the force to keep the peace and victory. You will want to know the money it pays, the chances for advancement, security and personal improvement, and living conditions.

It is true that some uncertainties of what the future holds for members of the Regular Establishment depend on Congressional action, but to those who contemplate enlisting or re-enlisting now, under existing laws and regulations, the AAF has a lot to offer, either as a permanent career or as a stepping stone or training period for a later civilian career.

What about money? You know what the current pay is, from private to master sergeant. The Army pay increase instituted during the war is not just temporary but a part of permanent law. In addition to pay, there are the permanent advantages of 30 days furlough a year at full pay, full pay while sick or convalescing, savings resulting from purchasing privileges at commissaries and Army exchanges, etc.

And you won't lose the temporary grade you now hold in the AUS, but you will be given a warrant in that grade if you enlist before 1 February 1946. Enlistments may be made for periods of three years, two years or 18 months, at the option of the individual, and even for one year plus your re-enlistment furlough time by those who have already served six months in the AUS. There are other immediate benefits such as re-enlistment allowance, mustering-out pay and furlough travel allowance. An individual enlisting for three years may initially choose certain overseas theaters, his present organization or a specific station.

If you desire to make the AAF your permanent career, you may retire upon completion of 20 years' active service at a rate of pay equal to 2½ percent, for each year served, of the average annual enlisted pay (including longevity pay) received for the six months immediately preceding retirement. The right to serve the traditional 30 years for retirement at 75 percent pay is not affected by this new benefit. Thus, if you want security in an AAF career, it is there. On the other hand, you can enlist for at least one tour of duty without minimizing or jeopardizing the educational, loan or readjustment allowance benefits under the GI Bill of Rights provided you enlist within the year ending 6 October 1946. Congressional action is now pending which may extend the provisions of the bill to 10 years.

Technical training, the stock-in-trade of all air force personnel, is continuing and regular air force personnel will have priority for such training. The training you now receive in the AAF is comparable to the very best training you can purchase from civilian institutions. One three-year period of enlistment will give you the experience and technical knowledge for a better and higher paying civilian job. Should you elect to remain in the AAF, continuing your training will open the door to a definite series of promotions.

Should you aspire to become an officer, appointments are available to the Military Academy, based upon the demonstrated abilities of the men who compete for them. In addition, discussion is underway to provide an air force officers school.

Off duty educational programs, both of the self-teaching correspondence school type or through the post school system, are abundantly available. Thousands of men, even under wartime conditions, have earned high school diplomas and others have obtained college degrees under this program.

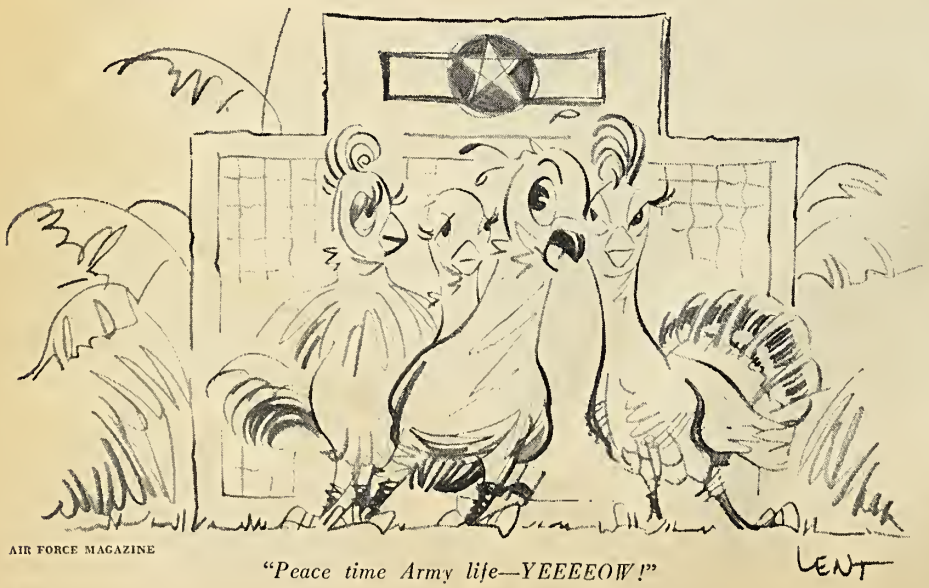
The foregoing is what the AAF has to offer you RIGHT NOW. What is planned for the future, if approved, will multiply these opportunities and advantages. Air force training is taking a definite place in civilian enterprise. It is no idle promise that if you choose to return to civil life after a few years, you will be better equipped professionally and intellectually to undertake a career in your chosen civilian pursuit by virtue of your air force training.

For the career soldier, a comprehensive program of formal education is being developed. This will provide for the educating of outstanding enlisted technicians in civilian colleges, manufacturer's schools and research laboratories. It will also serve to give enlisted personnel the opportunity of attaining commissioned status. Opportunities will be given to rated and non-rated personnel alike.

Improved living conditions represent another way in which the postwar air force plans to keep step with American progress —permanent bases with suitable quarters for married personnel, modern barracks, recreation and shopping facilities. Most of you, who are familiar only with wartime temporary bases of slapped-up wooden buildings on some desert or prairie wasteland, may say that's a dream. It isn't. The AAF's permanent bases were like that before the war, and they will be like that again, with added improvements. In selecting future airbase sites, such factors as metropolitan areas, resort sections, recreational and educational centers will be taken into account.

As for overseas bases, many of those too will be built up to permanent base standards. And for men serving at overseas bases, transportation to their stations will be furnished free for families wherever possible, for the first three grades.

If you are not settled in your postwar future, you could do much worse than stay in the AAF, either for a permanent military career or as a stepping stone to a better civilian career. Think it over and have a chat with the recruiting officer in your AAF unit. ☆



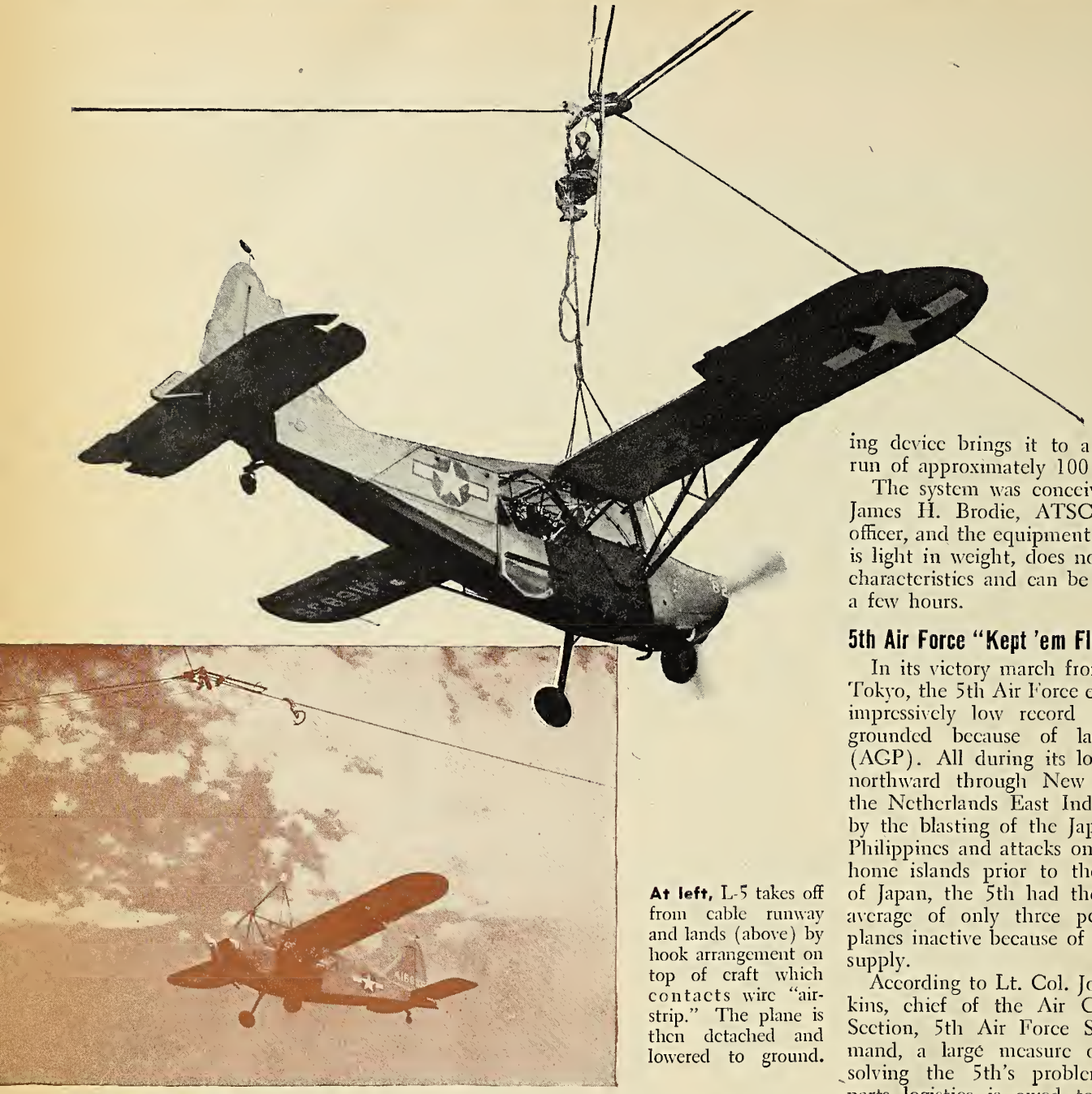
AIR FORCE MAGAZINE

"Peace time Army life—YEEEEOW!"

technique

Development, Maintenance and Supply of Aircraft and Equipment

Ground Control of Approach—Page 44



At left, L-5 takes off from cable runway and lands (above) by hook arrangement on top of craft which contacts wire "airstrip." The plane is then detached and lowered to ground.

Runways in the Air

By stringing taut wires from masts 65 feet high, the AAF can operate light planes from "trolley line runways" over scrub brush fields, soggy swampland, hillsides, coastlines or other places where the terrain is not suitable for the construction of a landing strip. Take-offs and landings are accomplished without touching the ground, and the cableway can be stowed in two C-47s for airborne shipment, can be dropped by parachute, or can be moved in on a couple of 2½ ton Army trucks. In moderately difficult country, using only hand tools, the 500-foot cable and the supporting masts can be set up and put in operation within 24 hours.

To take off, the plane is hoisted by winch and hooked onto the cable, while a holding line attached to the tail of the plane and secured in the ground, maintains the craft in a stationary position while the pilot revvs the engine up to take-off rpm. At a signal from the pilot, the holding line is released and the plane accelerates along the trolley wire until it gains flying speed, at which time the pilot releases the plane from the cable, clears the bridle wires and assumes a normal climb. To land, the flyer must maneuver his plane until the hook atop it engages a nylon loop suspended from the trolley. When contact is made, the plane rolls along the wire until a braking device brings it to a stop after a run of approximately 100 yards.

The system was conceived by Capt. James H. Brodie, ATSC engineering officer, and the equipment on the plane is light in weight, does not alter flying characteristics and can be rigged up in a few hours.

5th Air Force "Kept 'em Flying"

In its victory march from Darwin to Tokyo, the 5th Air Force established an impressively low record for airplanes grounded because of lack of parts (AGP). All during its long campaign northward through New Guinea and the Netherlands East Indies, climaxed by the blasting of the Japs out of the Philippines and attacks on the enemy's home islands prior to the occupation of Japan, the 5th had the overall low average of only three percent of its planes inactive because of difficulties in supply.

According to Lt. Col. Joseph P. Harkins, chief of the Air Corps Supply Section, 5th Air Force Service Command, a large measure of credit for solving the 5th's problems in spare parts logistics is owed to the special AGP courier service inaugurated by Col. Joseph C. A. Denniston, 5th ASC commander, for the sole purpose of facilitating tech supply operations. Whenever an airplane was grounded for lack of parts, a complete report was made available to all other bases within the framework of the 5th Air Force, indicating the items needed. This reporting method kept all service units informed of the day-to-day requirements of the other units, and any part in the stockrooms of each of the 35 airbase and service squadrons was made available to every other squadron whose need might be more imperative. The courier airplanes picked up AGP reports and AGP parts each day and ae-

complished delivery to every installation in the far-flung chain.

In operation, the AGP system combined routine organizational duties with typical G.I. scrounging. In one instance, as reported by Col. Harkins, a P-51 squadron was scheduled for take-off on a fire-bomb mission from Lingayen at 0600 hours. On the previous afternoon, however, a line chief had determined that the planes would not be ready for the mission unless the worn brake seals were replaced. Lingayen supply notified M/Sgt. Claude Wilkes, at 5th ASC headquarters by telephone that there wasn't a serviceable brake seal in the Lngayen area, and Sgt. Wilkes promptly sent the AGP men into action. S/Sgt. Edward Eckdahl notified all bases of the urgent need, and as return calls filtered in from distant airdromes on Luzon, it appeared that Laoag, Subic Bay, Floridablanca and Manila could be counted on for only one each. This left one brake seal outstanding, but Cpl. Ralph Heineman went to a P-51 which had crashed nearby at Clark Air Center, and removed a serviceable brake seal within two hours. Five different locations were therefore to be drawn from, and Cpl. Gilbert Draper arranged for air transportation to pick up and deliver the parts. At 2000 hours the five brake seals were ready to be installed, and crew chiefs worked through the night taking the wheels apart so that the seals could be inserted. The repairs and ground testing were finished at 0530—a full half hour before take-off time—and the full squadron was airborne on schedule.

"Pyro-Trooper" Suit

Jumping out of planes into the heart of the northwest timber country with special airborne fire-fighting equipment, a detachment of "pyro-troopers"—on loan to the U. S. Forest Service from the AAF—can bring almost any conflagration under control, quickly and surely. To accomplish this, the Personal Equipment Laboratory at Wright Field was asked to improve and perfect a new type of suit, a spot-landing parachute and a protective face mask and helmet.

(Continued on P. 44)

tech topics . . . about aircraft and equipment

The Aero-Medical Laboratory at Wright Field has developed a gyro-theodolite which measures limitations of fields of view from aircraft at eye level. It offsets disadvantages of bulk and immobility in the surveyor's theodolite previously used and permits measuring functional visual angles associated with movements of the pilot's head, eyes and body.

Eight .50 caliber guns have been installed in the P-47N, giving the airplane one-fourth again its normal firepower. . . . Recent tests with a turret having two 20-mm cannon as its firepower showed the guns could fire at 400 rounds per minute.

An experimental "Vee-Tail" installation is being tried on three P-63s. The "Vee-Tail" eliminates the vertical rudder and slants the elevators and horizontal stabilizers at sharp angles so they serve both as elevators and directional controls. . . . The idea also has been tried on a Beechcraft trainer. Another new aerodynamic experiment is the test of a circular arc airfoil section which is believed to be an ideal wing design for supersonic speeds.

Dropping landing fields by air is the latest twist to airborne operations. A unique system whereby light planes can land and take off from a tautly stretched wire between two towers, easily knocked-down and transportable by air, has been devised. And now a cluster of four 40-foot parachutes have been designed to drop the "landing field" from a cargo airplane.

Auxiliary wing tanks which have been used for carrying everything from gasoline to life rafts for injured personnel now are

being fitted with cameras. Modified tanks provide facilities for carrying a K-24 camera. Experiments are being tried with this installation on a P-51 airplane.

Post-war utility of the Flying Fortress as an airliner is being determined with a B-17 which has been converted into a transport. All armament, oxygen and other auxiliary equipment has been removed. Navigation and radio equipment have been relocated on the flight deck. Passenger seats have been installed in rear compartment, bomb bay and nose, with additional windows to provide visibility for passengers. . . . Two models of the P-51 have been turned into two-seater aircraft for advanced pursuit training. The extra cockpit is aft of the conventional one, but under the same bubble-type canopy.

Cowboy boots may be smart fashion for a new emergency rescue parachute jump shoe. An experimental boot, similar to that used by the U. S. Forestry Service, is

being tested for that purpose. It looks like the one the boys wear in Texas and its main advantage is the extension of the shoe lace to the toe, which gives more ankle and arch support. . . . Another new item of personal equipment is a clothing envelope for flight nurses. It is designed as an accessory to the Flyer's Clothing Bag and protects clothing while hanging in barracks.

Overseas reports have indicated that control of runway lighting systems from the control tower is necessary even for temporary installations, and as a result the manual portable runway lighting control device. The automatic runway lighter weighs about 1,000 pounds, compared with the 600-pound weight of the manually-operated control.

The helicopter, which because of its hovering characteristics has been considered an ideal aircraft for making rescue pick-ups, now is on the other end of the rope. Engineers are working out an air-to-air pick-up method that permits a conventional aircraft to snatch a helicopter in flight and tow it like a glider. . . . Using this system, a helicopter can be towed for several hundred miles, then cut loose to hover over a group of stranded airmen and perform its rescue mission. The evacuation completed, the tow-plane hooks on again, hauls the helicopter back to its base.

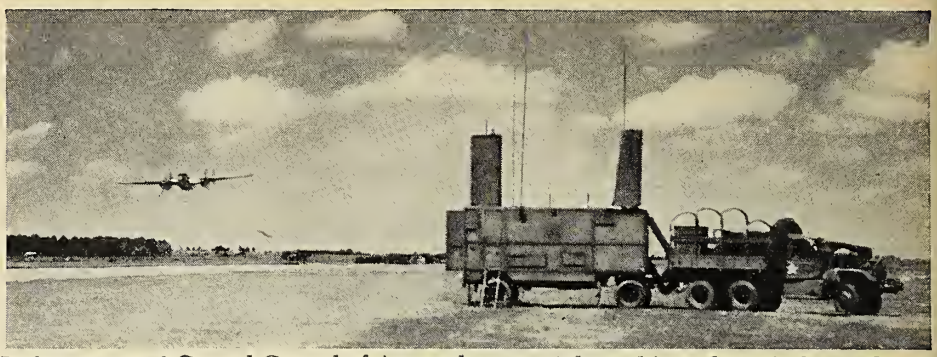
Escape through the rear hatch on the B-32 previously was difficult because of auxiliary equipment. To improve egress conditions the camera and its mount which were located near the hatch have been made jettisonable. By simply pushing a button the parts fall away leaving the hatch open for crewmen to bail out.

The standard forestry suit was modified with quick-opening zippers and additional padding, while a cover-all garment made of fire-resistant canvas permits a trooper to crash through thick underbrush without getting a scratch. To enable a man to land at the most desirable spot, slot openings in the parachute canopy which open and close in response to tugs on the shroud lines, can slow or speed descent and effect directional control. Also, an auxiliary belt with a quick-release mechanism makes it possible for a jumper to lower himself to the ground when his chute lodges in a tree.

A lightweight "catcher's mask" protects the man's face, while a specially designed helmet made of a tough plastic-impregnated material covers his head and the nape of his neck.

Radar Landing Approach

As an outgrowth of the instrument approach systems and glide path "beam" methods of guiding a plane down to a safe landing under conditions of zero visibility, a radar unit called Ground Control of Approach (GCA) is now providing a continuous indication of the position of planes within a radius of 30 miles. It also is giving pilots accurate range and azimuth data at all times and is able to place a plane within 50 feet over the center of the end of the runway. The system permits direction of several planes at the same time.



Radar-operated Ground Control of Approach system is housed in trailer unit shown above. Interior view, below, shows operators directing incoming plane onto correct flight path.

GCA is a completely mobile unit equipped with a combination of two specialized radars—an X-band precision system and an S-band search arrangement plus a multi-channel radio communications system. The search system locates incoming planes by means of radar echoes reflected onto a horizontal semi-transparent mirror which also reflects map information in order to establish the plane's position both in the air and with relation to the surrounding terrain. The traffic director gets one or more planes into a traffic pattern and turns them over individually to the plane selector, who tracks the plane on the precision system and directs it onto the ideal flight path. Two trackers—an azimuth tracker and an elevation tracker—manually operate cursors, or transparent rules mounted over the face of the maps, and keep them constantly over the center of the echo to trace

what's wrong with this picture?

"Off the beam" describes these radio mechs, who are letting at least seven interferences jam their hook-up—antenna one says you can't find 'em all! The circuit is completed on page 47, but don't tune in on the answers until you've monitored a few more hot leads. The "ham" actors—who want it made crystal clear that their erratic static is strictly dramatic—are Pvt. George Babcock, M/Sgt. William Thoma, T/Sgt. Harvey Kieft and Cpl. Ralph Morgan, all of the 4000th BU, Wright Field.

any deviation from the prescribed landing path. Every movement of the cursors is recorded in error meters in front of the approach controller. The latter studies the meters and gives precise directions to the pilot in order to keep him on the correct approach.

Along with verbal instructions, the pilot is advised of every azimuth deviation by an audible radio signal which is automatically controlled by the azimuth cursor and transmitted to the pilot through the communications channel. The sound is coded so that the pilot knows whether he's on course, off to the right or off to the left. Degree of deviation is indicated by a change of pitch.

XB-36—Biggest Bomber

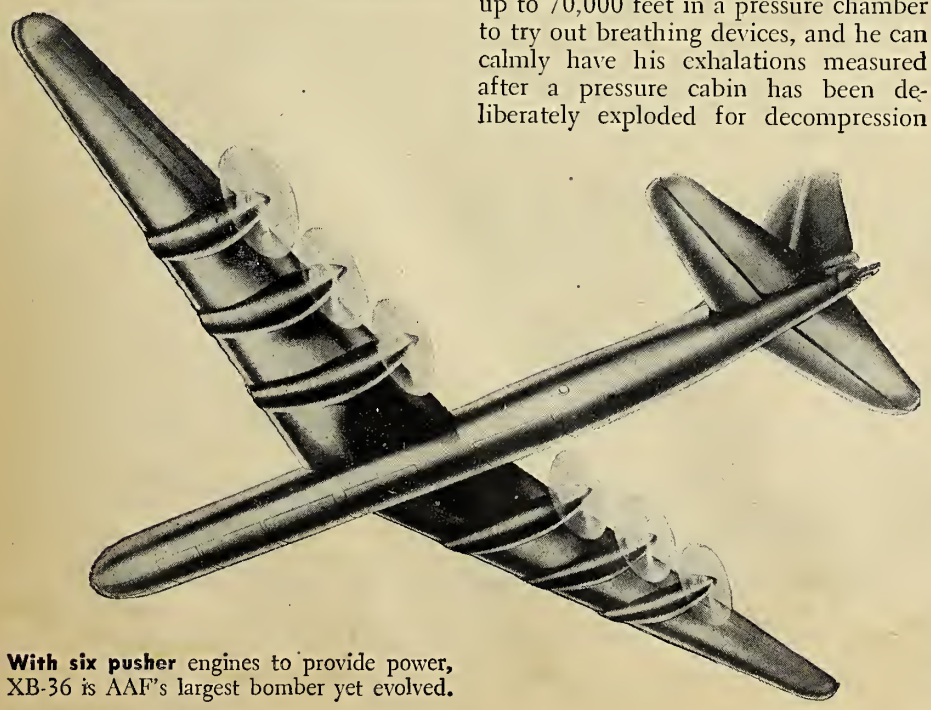
Dwarfing the B-19 — previously known as the largest airplane in the world—the new XB-36 is about to take to the air. The 65-ton giant can develop more horsepower than two B-29s. It has more turrets than any other bomber ever built, and its guns can spew a ton and a half of lead and steel per minute.

The 150-inch diameter fuselage is circular in cross-section and is 163 feet long from nose to tail. The rudder towers 46 feet, 7 inches above the ground, and the horizontal tail surfaces are only nine square feet less in area than the entire wing of a C-47. The pressurized compartments, linked by a tunnel in the Superfortress manner, accommodate the crew of 17, which includes relief personnel required on long-range flights. Comfortable bunks provide rest during off-duty hours, and a small galley is used to prepare hot meals when aloft.

Power for the plane comes from six P&W radial, air-cooled pusher engines, each capable of producing in excess of 3,000 hp. The wing is an NACA airfoil section with a sweptback feature that insures aerodynamic cleanness and low drag characteristics. Ducts in the leading edge supply air to the engines, and mammoth flaps—each almost the size of an A-26 wing—reduce landing speeds and take-off distances.

The big bomber rests on a tricycle landing gear consisting of two single main wheels and a nose wheel, all retractable. The wheels are 110 inches in diameter—the largest ever constructed. One tire, which weighs 1,500 pounds, would support a fully loaded B-29.

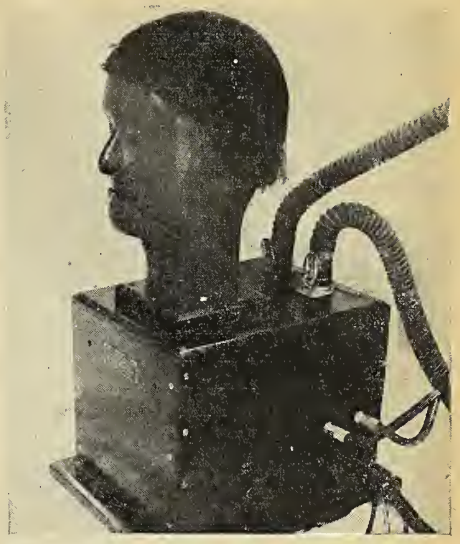
Flying six miles above the earth will be routine, and non-stop flights from Tokyo to New York will be matter-of-course.



With six pusher engines to provide power, XB-36 is AAF's largest bomber yet evolved.

Aero-Meds "Human" Heads

Horace the Head looks like a mummy's noggin, but he breathes, runs a temperature and can even smoke a cigarette. He's the model of a man's head which Aero-Medical Laboratory experts are using in a series of tests to determine performance characteristics of new types of headgear worn by our airmen. Horace can be put into a cold chamber and have his face frosted up beyond anything a man could endure in order to find out what happens to an oxygen mask when it's actually being worn under such conditions. He can go up to 70,000 feet in a pressure chamber to try out breathing devices, and he can calmly have his exhalations measured after a pressure cabin has been deliberately exploded for decompression data.



Artificial head designed by Aero-Med Lab for tests of headgear and flying equipment can "breathe" through lung in the cabinet.

Horace is built up around a semi-rigid inner shell covered with sponge rubber and a thin latex skin. His veins are tiny electric wires similar to those used in electrically heated casualty bags, and breathing is accomplished by a bellows located in a separate cabinet. An automatic "lung" operated by a series of cams can make him gasp or pant, inhale tobacco smoke or blow out a match.

Malaria Controlled by Air

To make the occupation of Pacific islands and tropical regions more healthful for our garrison troops, the control of mosquito-borne diseases is being effected by DDT insecticide sprayed over Anopheles-breeding areas from planes. A single B-25 or C-47, fitted with a nozzle arrangement in the belly of the fuselage and carrying a load of DDT dissolved in kerosene or Diesel Oil No. 2, can cover a 2,000 acre area in less than 12 minutes flying time — eliminating months of back-breaking drainage projects and constant oiling and dusting operations.

C-47s are considered ideal for this work because of their known stability, load carrying capacity and maneuverability at low altitudes. The tank installation consists of three 335-gallon lightweight tanks which permit a total of 1,000 gallons of insecticide in a single load. Two of the tanks are installed side by side, 12 inches from the floor, in the aft portion of the cabin, and the other tank six inches from the floor immediately behind them. Wooden cradles support the tanks in position and the entire installation is tied to the floor.

Liquid Oxygen for Breathing

Because liquid oxygen containers are less bulky than the heavy containers now used to store breathing oxygen in an airplane, the AAF is running a series of tests to determine their practicability for breathing purposes at high altitudes. Since a 150-gallon container of liquid oxygen weighs 3,000 pounds and can produce the same amount of oxygen as 70 high-pressure oxygen cylinders scaling at 10,500 pounds, the logistics of oxygen transport would seem to be materially affected.

To date, a mobile generator which will produce oxygen in a liquid state has already been developed, and a servicing unit for vaporizing the liquid oxygen, together with special charging equipment, is on the way. In addition, a liquid oxygen walk-around bottle has been perfected, weighing only six pounds and capable of supplying a man with enough breathing oxygen for approximately eight hours, depending on the altitude and the degree of activity.

Parachute Tester Tower

Now that the AAF has perfected high-speed aircraft, the problems of bailing out at such accelerated rates of travel will be carefully studied at Wright Field with the assistance of a large centrifuge mounted atop a 120-foot high pylon. Without endangering personnel, the new parachute test device whirls a chute and a man-sized dummy at the end of a 200-foot boom until fighter-plane speeds are attained. Then an automatic device cuts loose the chute and pulls its ripcord in the same action that would result if an actual pilot were to throw open the bubble canopy, hurl himself out into the airstream while traveling at a comparable speed and open his parachute.

The test rig is driven by a 3,000 hp electric motor which is located in a concrete control house and is operated from a master instrument panel. The tower makes possible "ground testing" of any size parachute from one foot to 80-feet in diameter. Dummy weights from 100 to 4,000 pounds can be dropped at high speeds — a valuable study for future airborne operations.

The test tower is a development of the Pioneer Parachute Company, and it is expected to be in operation at ATSC headquarters sometime next spring.

NAD Reclamation Section

Since its activation in April of 1943, the reclamation section of the North Atlantic Division, ATC, stationed at the Presque Isle, Maine Army Air Field, has a score of 96 reclamations to its credit. The unit is composed of 13 enlisted men and one officer and they stand ready at all times and in all weather to reclaim damaged aircraft resulting from crashes throughout an area stretching from Maine to Greenland.

Salvage operations in remote areas during cold weather were routine with members of ATC Reclamation Section, N. Atlantic Div.

Up to the end of the war, savings in salvage and reclamation totaled more than $5,000,000. Rugged terrain and weather conditions were encountered in most instances and the unit has had recourse to amphibious tanks, snowmobiles, motor toboggans, boats, mule teams and other means of transportation. The outfit owns a 22-foot freight canoe equipped with a 17-hp motor for navigating the many rivers and lakes of the north. Each man is supplied with skis, snowshoes and arctic issue.

Mounted atop 120-foot high pylon, a parachute with a man-size dummy is whirled in tests to determine high-speed bailout data.

Better, Faster Fifties

At the war's end, an improved version of the AAF's .50 caliber machine gun, which could fire almost twice as many rounds per minute as the standard gun and which incorporated superior belt lifting and better feed and cooling mechanisms, was ready to replace the M-2 guns in fighters and bombers as rapidly as the conversion could be accomplished. The new machine gun (M-3) fires up to 1,200 rounds per minute, and its projectiles slam into the target with an impact force of approximately 4,500,000 pounds — enough concentrated fire to cut through the heaviest of armor.

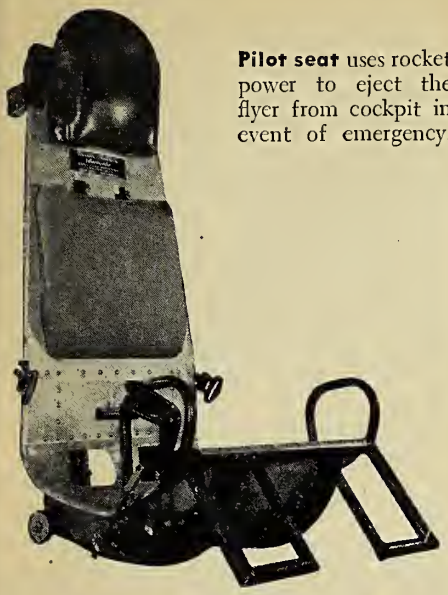
To obtain such firepower for the new gun, engineers eliminated hydraulic fluid from the standard M-2's buffer system, increased the size of the belt feed slide, reduced the weight of all moving parts to a minimum, added a gas-operated muzzle and provided a Stellite steel barrel liner to afford longer life at higher temperatures.

Gunnery System Tester

A turret tester which can simulate the roll, pitch and yaw of an airplane on a combat mission is being used by ATSC engineers to study existing remote-control gunnery turrets and to perfect new ones. The device consists of a moving platform on which a turret is mounted, and two 20-foot high towers supporting a screen and a target projector system which travels on a circular track to give variation in the azimuth and elevation of the target.

Pilot Ejection Seat

The ATSC's Aircraft Laboratory engineers are at work on an aircraft seat which will utilize rocket power to eject the pilot from the cockpit when bailing out becomes necessary in high-speed planes. The final design has not yet been established, but in all probability the main seat framework will consist of a "bucket" of pressed steel and aluminum, with hooks to make it possible for the pilot to harness himself in, parachute and all, and stirrups and handgrips to hold him in the seat during



Pilot seat uses rocket power to eject the flyer from cockpit in event of emergency.

ejection. If it becomes necessary to hit the silk, fiber blocks and steel wheels, bolted to the back of the main seat frame, will guide the seat straight up and out of the airplane, once the rocket charge is fired.

To eject himself, the pilot raises the arming lever to remove the firing pin from the trigger plunger, and squeezes the firing lever on the right hand grip. This causes the firing pin to strike a primer, igniting the main charge and shooting the seat up and out of the cockpit.

What's Wrong with the Picture on Page 44

1. Starting at left, the man is holding the cable in such a way as to pull wires loose from the connecting strands.
2. The M/Sgt. is using the wrong kind of insulating material. In tropic areas, fungi thrive on tape. Waxed cord should be used as the binder.
3. What is that strange object on the concrete behind him? Can it be that the boys plan to use an electric soldering iron with a gasoline torch?
4. See that spool of antenna wire? It's hanging from an APN-1 antenna —which was not designed as a convenient hook.
5. The Sgt. clinging to the P-61's boom is violating safety rules as well as causing injury to the plane.
6. The man at the right is standing on a costly piece of radio equipment, and his weight can easily ruin its delicate wirings.
7. In drilling that hole, he's bound to puncture the Black Widow's skin. Always put a wooden block between the strip and the skin when doing drill work of this nature.

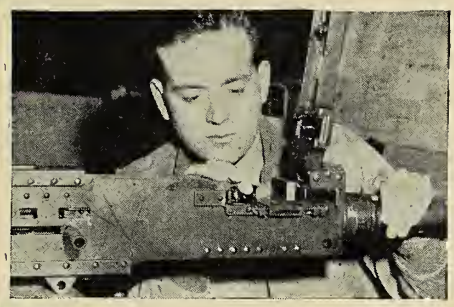
on the line

with mechs around the world

At an airbase in India, the skills of instrument maintenance personnel were fully "mobilized" when M/Sgt. Clarence V. Haines, Memphis, Tenn., constructed this miniature automobile out of scrapped parts and mounted portable electrical and instrument test sets on it. The speedy little carrier averted many a crisis by appearing promptly where needed most.

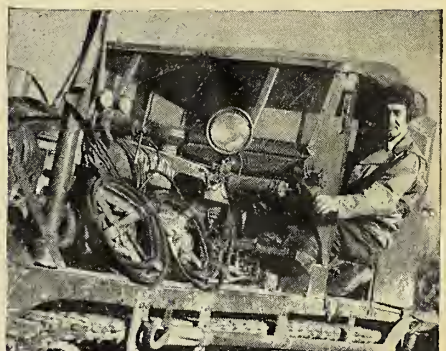
or by a C-10 auxiliary power unit, and parts for the hoist included two regulation manual hoists, four relays, a two-horsepower motor and suitable switches, cables and plugs.

A mobile maintenance unit which permits swifter sheet metal repairs to damaged aircraft has been built by mechs at Pueblo Army Air Base, Pueblo, Colorado. Powered by a one-cylinder gasoline motor, the tricycle features an air compressor for pneumatic riveting and a generator for drill motors, in addition to two air storage tanks. The unit is belt-driven by a pulley mounted on the right-hand wheels.



A former B-17 radioman-gunner, S/Sgt. Joseph A. Morris, Miami, Fla., recently received the commendation of Brig. Gen. J. H. Houghton, CG of the Second Base Air Depot, Blackpool, England, for designing a gauge which enables armament technicians to ascertain quickly if ammo belts will function properly in the .50 caliber machine guns mounted in pursuit planes. Made out of chrome molybdenum, the gauge is inserted in the feedway and instantly determines whether or not the belts will be "riding" high enough to remain in the gun during the centrifugal pull exerted during aerobatics.

Cranking 500-pound bombs into a B-24 bomb bay by hand was tough, slow work. To save such time-consuming labor at their airbase in Italy, Capt. Clifford Moan, Denver, Colo., and Cpl. Grady W. Allman, Asheville, N. C., devised an all-electric bomb hoist which would lift a quarter-ton bomb to the top station of the bomb bay in 40 seconds. Power was supplied by the plane's electrical system



With eight special attachments ranging from a derrick to a battery charger, plus the installation of radio equipment, Sgt. Leo F. Alton, Little Sioux, Iowa, has made his G.I. cle-trac into an all-purpose mobile maintenance shop. At his 12th Air Force B-25 base in the Mediterranean theater, Sgt. Alton had many opportunities to put his innovations to the test, what with rush radio calls being received from stuck-in-the-mud Mitchells. For his ingenuity he was awarded the Legion of Merit.

SHOOTING THE BREEZE

GOT ANY GOOD STORIES? SEND 'EM IN!

France. A young jeep driver for an AAF public relations office went swinging into the mail room one day, his jacket open and his hands in his pockets. "I've got points that jingle, jangle, jingle," he was singing loudly, "and I know they will carry me right home. I've got points. . . ." He turned it off abruptly when he came face to face with a brigadier general.

"Button up that jacket," snapped the BG, and the young man hurried to comply.

"What section are you in?" the general demanded, and he hardly gave the flustered EM a chance to reply before asking:

"What's your rating?"

"I'm a private, sir," replied the jeep driver.

"What? A private?"

"Yes, sir."

"Well . . . Button up that jacket," the general muttered and walked away.

Massachusetts. The good-natured rivalry between Harvard and the Massachusetts Institute of Technology seems to have extended even into the ether, if we are to believe a story brought back to us from the home of the bean and the cod. All during the war, M.I.T. operated its Radiation Laboratories, a super-secret research house which developed many of the AAF's radar devices, while half a mile away Harvard's Radio Research Laboratory was deeply engaged in developing radar countermeasures. The two staffs would go about their researching in amiable fashion until those occasions when the Radiation Laboratory's radars would be transmitting at the same time that the Harvard scientists would have their RCM electronic jammers turned on—and on the same frequencies. These coincidences usually would send an M.I.T. official screaming to the Harvard staff, "For God's sake, turn off your jammers. We have an important demonstration going on to prove how good our sets are, and you are lousing up the show!"

Ohio. The plane circled Patterson Field with its pilot and co-pilot standing by on VHF radio for landing instructions. The conversation with tower went like this:

"Patterson tower, this is Army 6751, over."

"Army 6751, this is Patterson tower, over."

"Patterson tower from 751. About five miles northeast. Request landing instructions, over."

"Roger, 751. Landing runway into southwest. Wind 10 miles per hour from 220 degrees. Call on base leg. What is highest rank on board?"

"Tower from 751, highest rank on board is two stars, over."

"Roger, 751, is that two one-star generals or one two-star, over?"

France. The pilots of a tactical outfit, somewhat cynical and loaded with points, had followed with mounting fury the sundry pronouncements concerning how quickly they were going to be redeployed to the States and discharged. One particularly glowing edict out of Washington was the last straw. That afternoon all the P-47s in the outfit flew over the adjacent countryside in a neat formation that spelled out: "N-U-T-S."

Marianas. A ranking British officer visited a weather station on a recent inspection trip with several top American air commanders. "Well, what do you think of Weather?" the Britisher was asked on completion of the tour. "Bloody damp, I'd say," the visitor replied.

Germany. The heavy bomber had scored direct hits on a synthetic oil plant when it was blasted by intense flak which knocked out two engines, the radio transmitters and the fluxgate compass. While the crippled plane struggled along at 115 miles an hour, steadily losing altitude, the navigator was working his DR knowledge overtime. He turned to a gunner nearby to ask him to be on the lookout for landmarks when the cloud base broke, but to the navigator's amazement the gunner appeared to be asleep.

"Hey, Joe, wake up. How in hell could you sleep at a time like this?"

The gunner looked up, blinking. "Oh, I wasn't sleeping, sir, I was praying." ☆

RENDEZVOUS

(Continued from Page 2)

tionale) by carrying the greatest payload to an altitude in excess of 2,000 meters at Fairfield, Ohio. Major Haynes and crew had aboard 31,162 pounds, taking off and landing with this load on the then sod airdrome at Patterson Field. Captain Old was the co-pilot on this flight.

International load and speed record (F.A.I.), August 1-2, 1939—From Patterson Field, a payload of 2,000 kilograms was carried over a 5,000 kilometers course at an average speed of 166.32 mph in the XB-15. Major Haynes and Captain Old took off about 10:00 a. m. August 1, and flew a course from Dayton, Ohio, to Rockford, Ill., continuously until dawn August 2, landing at Patterson.

Flight to the Galapagos Islands, May 9, 1940—This photographic survey flight was ordered personally by General Arnold, who was present at Albrook Field, Canal Zone, for the take-off, in order that a comprehensive analysis of the possibility of establishing airbases on the Galapagos Islands for the protection of the Panama Canal might be made. Since this was the first flight over the islands, which belong to Ecuador, the War Department arranged for two officers from Ecuador to be on board the plane. Due to the great distance involved in this necessarily non-stop round trip flight (2,839 miles), take-off was made at midnight, thereby insuring a maximum amount of daylight hours for taking the many photographs which were required. Major Haynes' navigator on this flight was Captain Curtis LeMay and the co-pilot was Lt. Hiette S. Williams.

Brig. Gen. C. V. Haynes,
1st Air Force,
Mitchel Field, N. Y.

Indigestion

Dear Editor:

On Armistice Day I was assigned to distribute leaflets over a rodeo at Indio, Calif., in a P-63.

I made my passes at approximately three hundred feet, and dropped the leaflets about five seconds after passing over my target, by shoving them out of the left window. The ship functioned normally during the mission, but when I applied climbing power the engine started to run rough. All power and mixture settings were of no avail, and about two minutes later the engine cut out completely. By reducing the throttle setting to about 25 inches I was able to get the engine running again, but it was very rough.

I got the ship back to the field, ran it up and checked the mags. The engine lost about 150 RPM on the right mag and slightly less on the left. I wrote the ship out and told the crew chief what happened.

A few minutes later the crew chief told me that he had found the remains of a lot of chewed up leaflets in the carburetor. It seems that they were sucked into the air ram as I let them go out of the window.

Lt. Benjamin B. Peck,
March Field, Calif. ☆

AIRPOWER—Through Japanese Eyes

"Of land, sea and air forces, air by a wide margin contributed most to the defeat of Japan."

REAR ADMIRAL TAKATA, deputy chief of military affairs, Navy Ministry.

"Our air forces were defeated in the air by your 5th and 13th Air Forces. The B-29s dealt the death blow to Japan proper."

LT. GEN. TAZOE, chief of staff, JAAF.

"We industrialists felt that air raids were going to finish the war, believing Japan could not last until an invasion. Air attack sealed the fate of Japan."

RYOZO ASANO, president, Nippon Steel Tube Co.

"The mast-high attack by American planes on our large convoy in the Bismarck Sea was the biggest shock of the war to Japanese naval strategy."

REAR ADMIRAL TAKATA.

"One of the biggest factors leading to the surrender was the bombing of the industrial cities of Japan. Our loss in the air lost us the war."

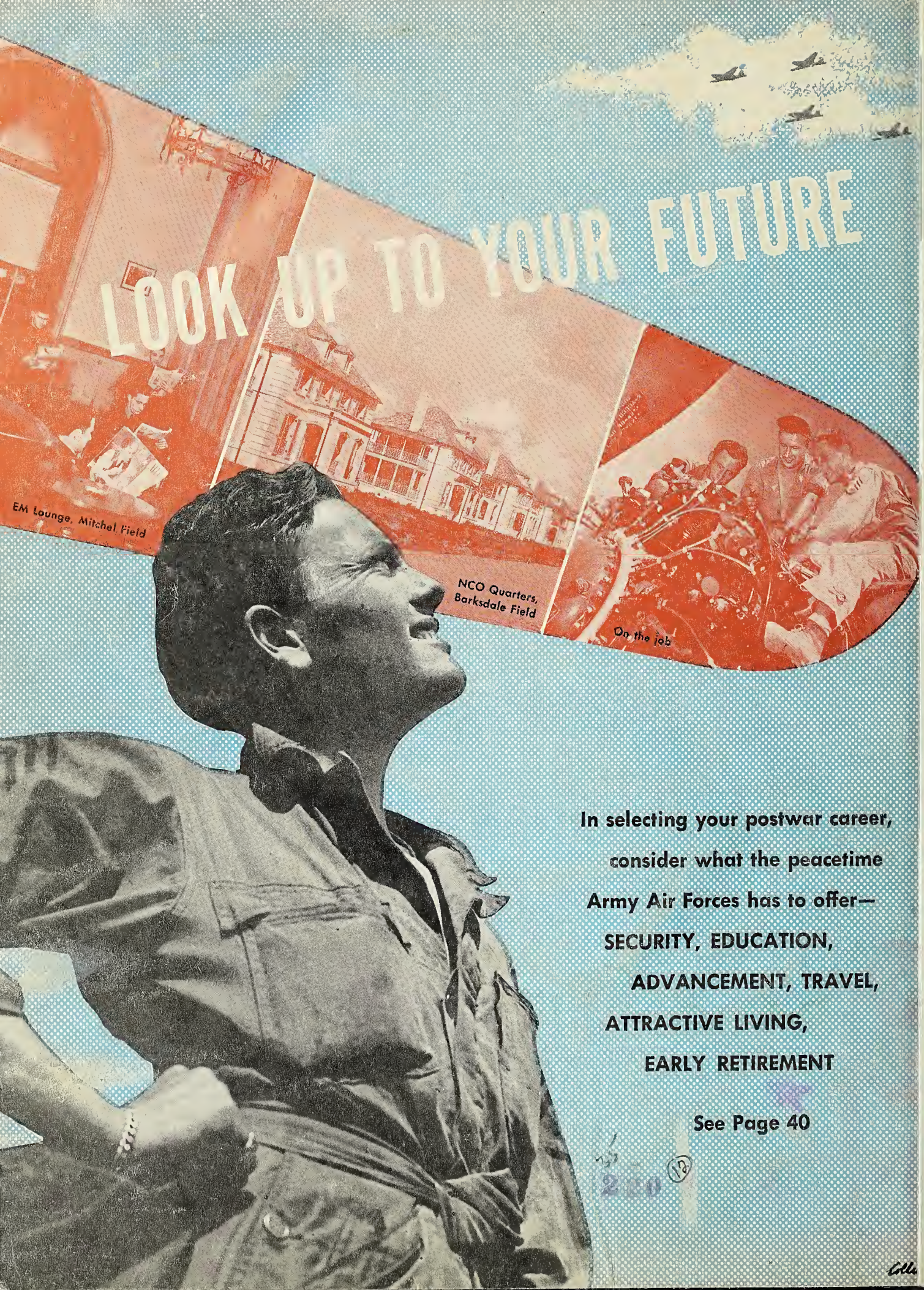
GENERAL KAWABE, commanding general, JAAF.

"It was not only the bombing of factories that defeated us; it was also the blockade which isolated us from raw materials and food."

TAKASHI KOMATSU, managing director, Nippon Steel Tube Co.

"In addition to the physical damage accompanied by bombing, there was a serious decline in efficiency due to difficult living conditions and decline in morale and effectiveness of the workers."

LT. GEN. ENDO, former head of the aircraft section, Ministry of Munitions.


LOOK UP TO YOUR FUTURE
EM Lounge, Mitchel Field
NCO Quarters, Barksdale Field
On the job
In selecting your postwar career, consider what the peacetime Army Air Forces has to offer—
SECURITY, EDUCATION,
ADVANCEMENT, TRAVEL,
ATTRACTIVE LIVING,
EARLY RETIREMENT
See Page 40

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